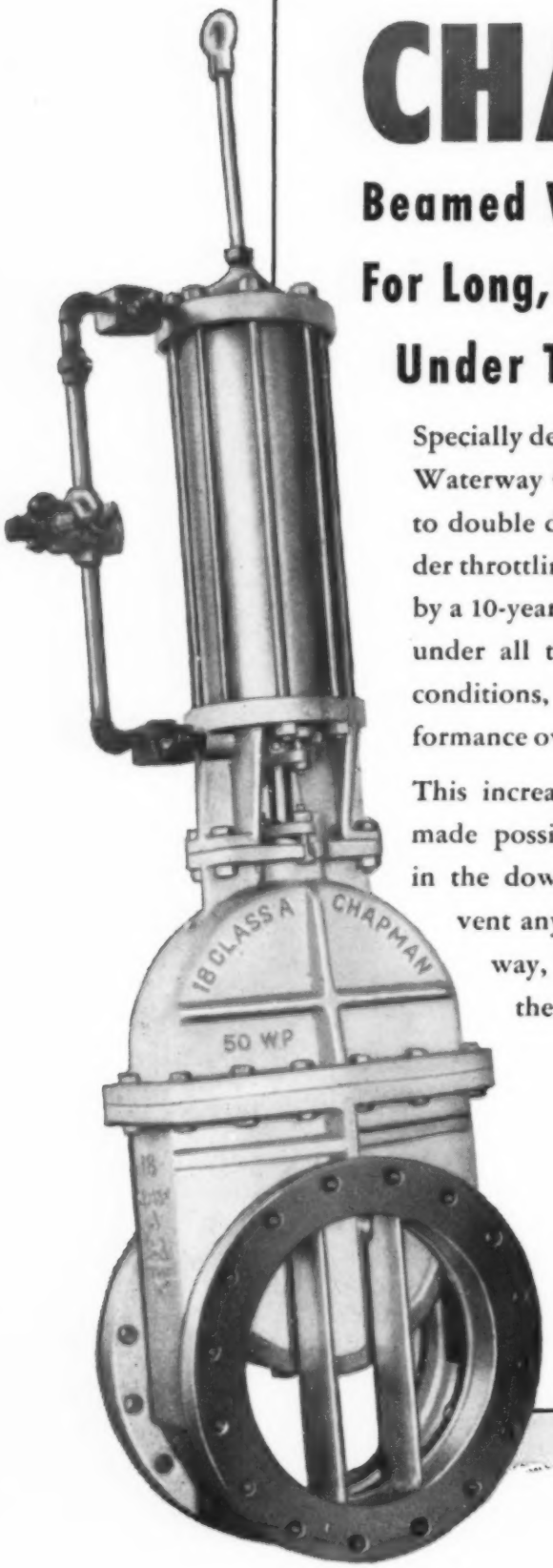
WATER & SEWAGE WORKS

SEWAGE TREATMENT PLANT—GREENFIELD, MASS.

CHAPMAN

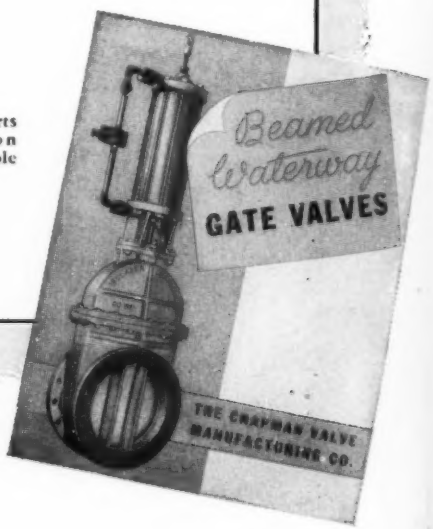
Beamed Waterway Gate Valves For Long, Dependable Operation Under Throttling Conditions



Specially developed by Chapman, these Beamed Waterway Gate Valves are markedly superior to double disc, parallel seated gate valves under throttling conditions. This has been proven by a 10-year test made in a large filtration plant under all the stringencies of actual working conditions, as well as by their successful performance over many years elsewhere in the field.

This increased efficiency and longer life are made possible by special bronze-faced beams in the downstream port which not only prevent any tipping of the disc into the waterway, but also prevent uneven wear of the seat rings and consequent leakage.

Bulletin giving reports from water filtration plants is now available for engineers



THE CHAPMAN VALVE MFG. CO., INDIAN ORCHARD, MASSACHUSETTS

WATER AND SEWAGE WORKS, June, 1947. Volume 94. Number 6. Published monthly by Gillette Publishing Co., 22 West Maple St., Chicago 10, Ill. Per copy, 25c. Subscription rate: United States, $2.00 per year; Canada, $2.00 per year; Foreign, $3.00 per year. Entered as Second Class Matter, March 12, 1946, at the Post Office at Chicago, Ill., under act of March 3, 1879.

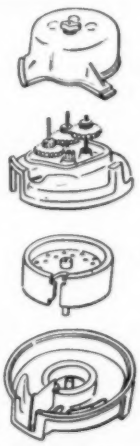
Why . . .

THE MOST METER COSTS THE LEAST

Even when Empire meters sold for a high premium over ordinary meters, they were still the least expensive you could buy. And at today's comparative prices they are the biggest meter bargain ever offered.

When you figure the cost of removing, repairing and replacing a stopped meter . . . when you figure the revenue loss on meters that register less and less as time goes on . . . then it becomes apparent that overall cost should be your chief consideration when buying meters.

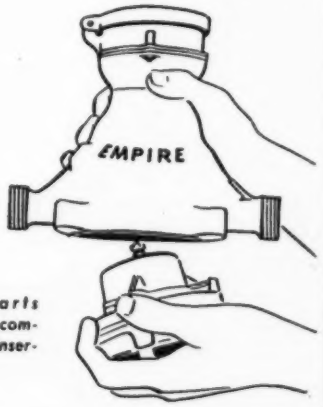
Empire meters, with their balanced oscillating piston principle, cost least in the long run. And this statement is backed by hundreds of water works men who have had ten, twenty, even thirty years of Empire metering experience.



Simple construction, interchangeability, few working parts.

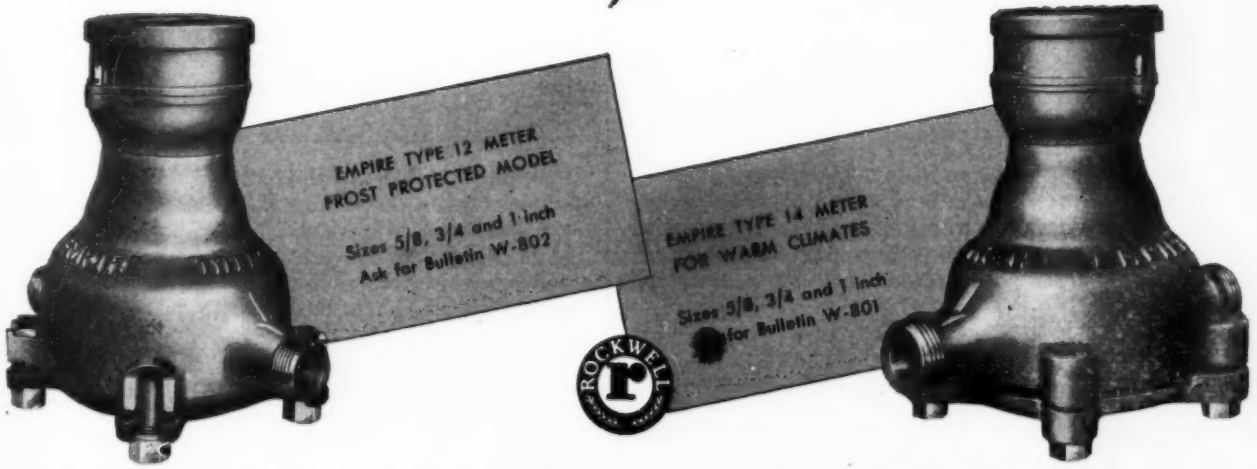
COSTS LESS TO REPAIR, TOO

Here is the simple arrangement of component parts of the working mechanism in Empire Type 12 and Type 14 meters. Speedy dismantling and assembly; fewer parts, exactingly interchangeable parts, all combine to make short work of meter shop operations. There are only three interior castings. They assemble without the use of screws. Fitting is quick, positive. The assembled measuring unit can be pre-tested for its free running qualities prior to being bolted in the meter case.



Working parts assemble as a complete unit for insertion in case.

EMPIRE *Oscillating Piston* METERS



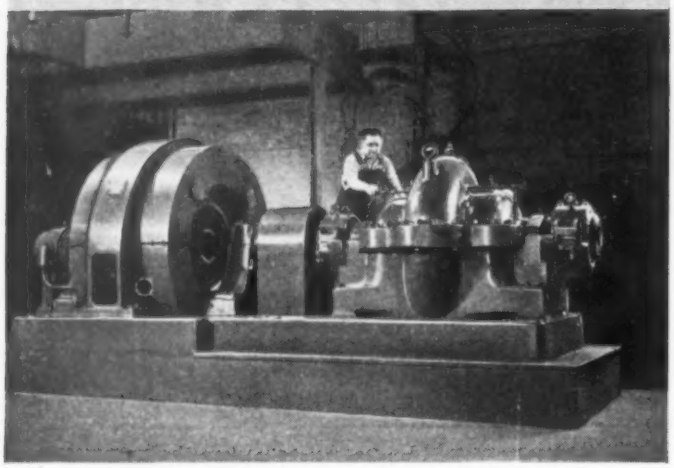
PITTSBURGH EQUITABLE METER DIVISION

Rockwell Manufacturing Company....Pittsburgh 8, Pennsylvania

Atlanta, Boston, Chicago, Houston, Kansas City, Los Angeles, New York
Pittsburgh, San Francisco, Seattle, Tulsa

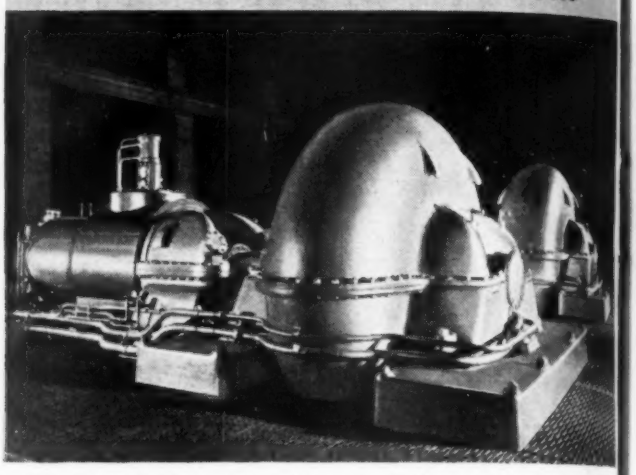
World's Widest

CENTRIFUGAL PUMPS



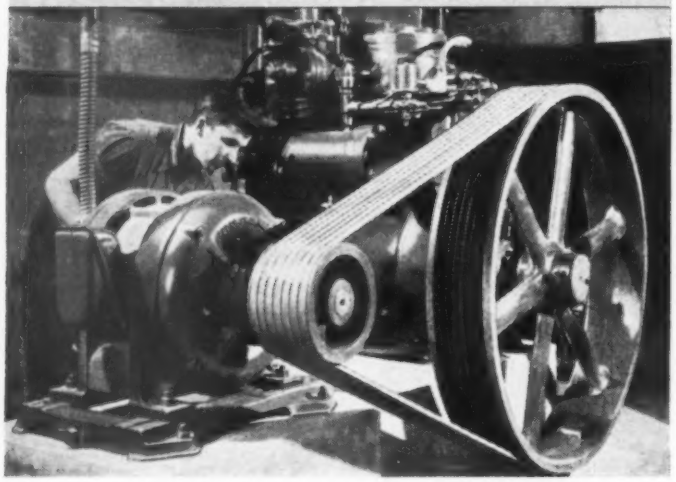
MIDWEST PUMPING station uses Allis-Chalmers pump-motor "team." A-C builds *all types of pumps for water and sewage works, fire protection, drainage and other public works.* Capacities range up to the largest. A-C can also supply any type and size of motor or steam turbine drive.

BLOWERS AND COMPRESSORS



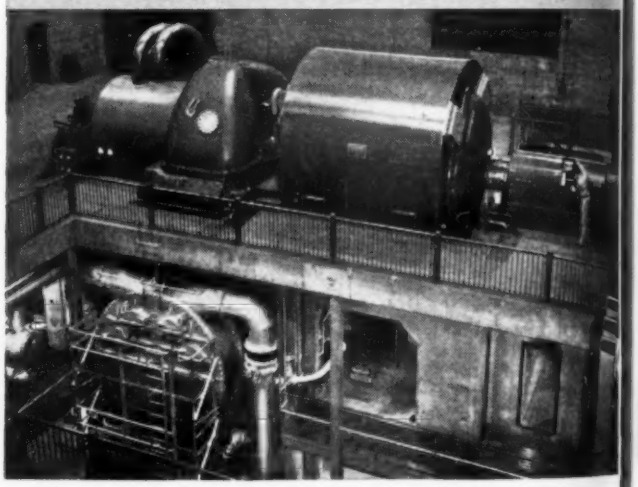
ALLIS-CHALMERS turbine-driven centrifugal blowers in Milwaukee sewage treatment plant. A-C builds multi-stage blowers up to 130,000 cfm, 35 psig; single-stage—600 to 35,000 cfm. 1 to 6.25 psig; rotary compressors—44.5 to 1,684 cfm, 5 to 35 psig; vacuum pumps—14.5 to 5,300 cfm, 18 to 28.5 in. hg.

MOTORS AND CONTROL



GENERAL OR SPECIAL purpose motors from *1 hp to 7,000 hp and over* are built by Allis-Chalmers. Motor control is also available to fulfill any requirement. And famous Texrope V-belt drives fit applications of power transmission from *fractional to 6,000 hp,* constant or variable speed.

TURBINES AND CONDENSERS



POWER PLANT INSTALLATION in Lansing, Michigan equipped with Allis-Chalmers turbine and condenser. For over 40 years A-C has been providing power stations with *all types and sizes* of steam turbines and condensers. Auxiliaries include air ejectors, circulating water, condensate, and boiler feed pumps.

Send for NEW Public Works Bulletin

Description of A-C equipment — published for Public Works engineers. Send for your copy today. Bulletin 25B6607, ALLIS-CHALMERS, MILWAUKEE 1, WIS.

Range OF MAJOR PUBLIC WORKS EQUIPMENT!

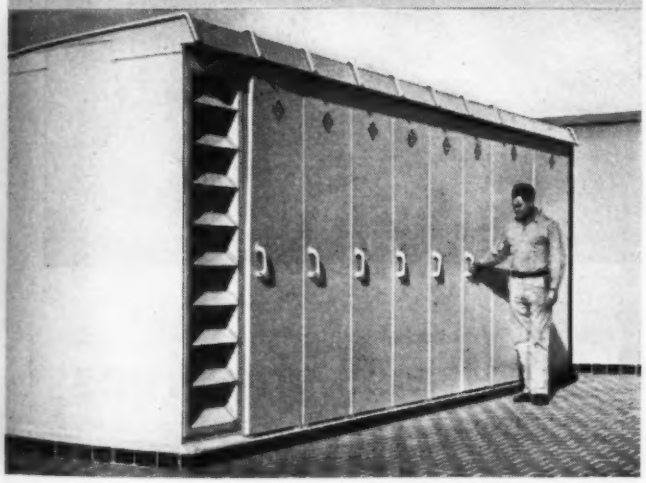
At Allis-Chalmers You Get Complete Line Ranging from Power Generation to Processing Machinery

WHAT DOES THIS LEADERSHIP in range of public works equipment mean to you? It means that you can get individual units of equipment *tailor-made to work together* . . . designed and built by one company.

Engineers know that for maximum efficiency, equipment must work as a team—*the right drive for the right pump—the right control with the right motors.* It is this coordination of equipment that saves you money and engineering worries. No other company offers you this kind of equipment engineering. No other company can supply you with so many different types of major equipment with emphasis on making them work together as an efficient team.

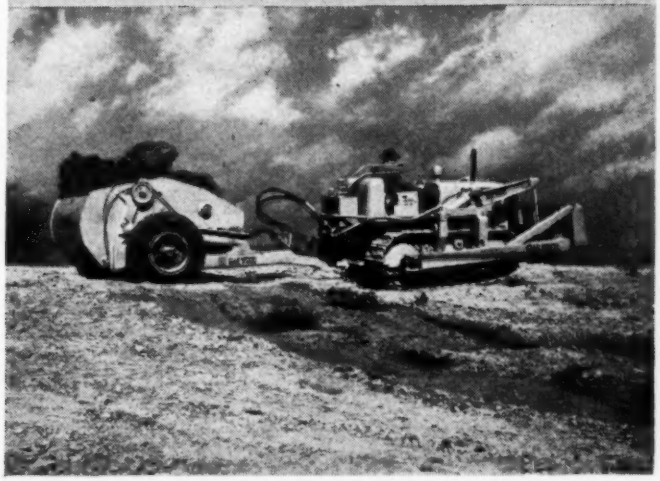
Whether you are planning to modernize or expand, call on Allis-Chalmers. Get in touch with your nearest A-C office or write to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

POWER DISTRIBUTION



PROTECTING MOTORS in West Coast pumping station—that's the important job of this Allis-Chalmers metal-clad switchgear. Completing the Allis-Chalmers power distribution line are transformers, circuit breakers, unit substations, motor generator sets, mercury-arc rectifiers, switchboards and industrial control.

HIGHWAYS AND PROCESSING

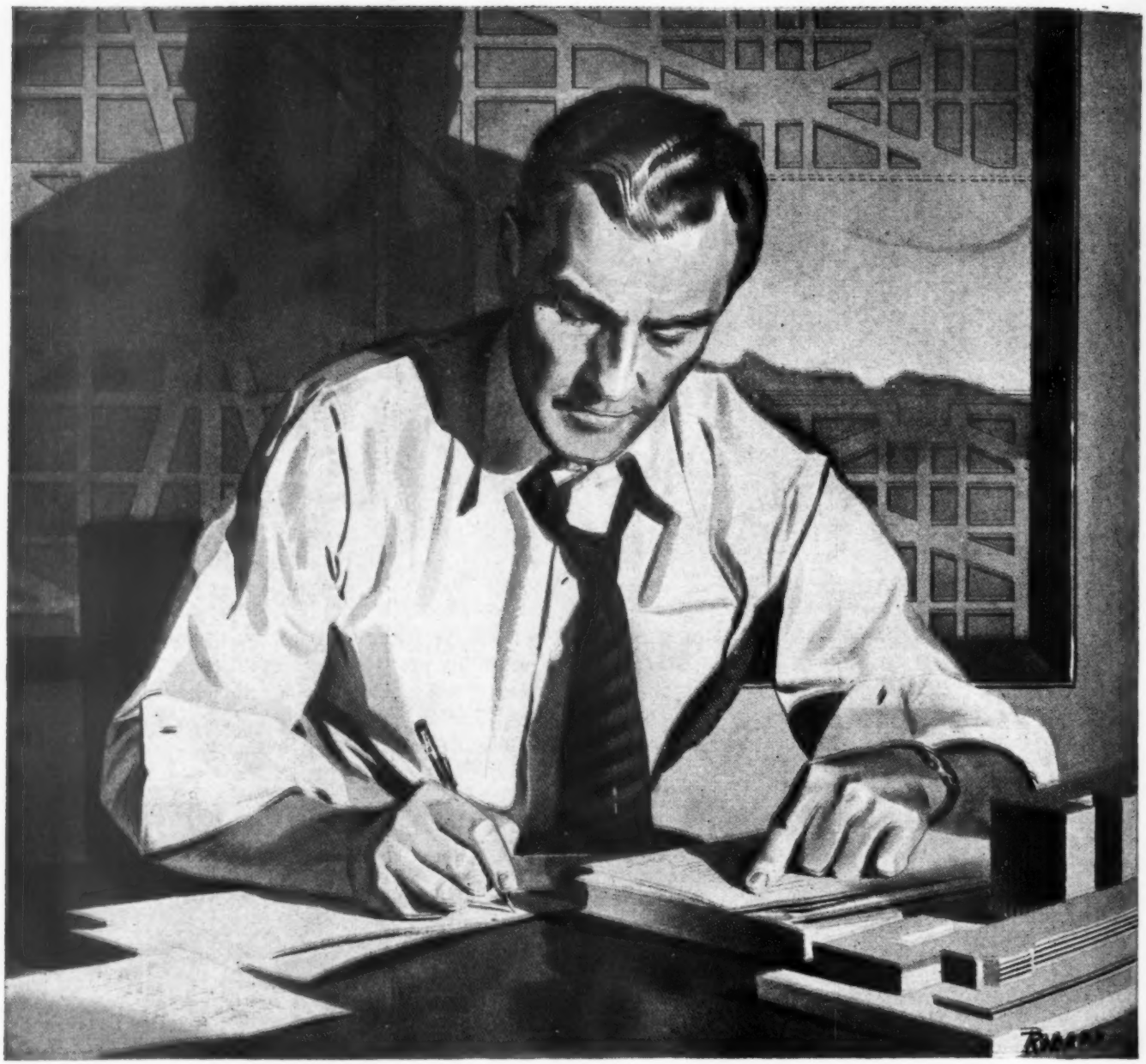


WHEEL AND TRACK-TYPE tractors, power units and motor graders are available in the *wide A-C line* of highway equipment. Auxiliaries are tampers, shovels, scrapers, rippers, bulldozers, mowers, sweepers, cranes and snow plows. Processing equipment; vibrating screens, crushers, kilns, sifters, and roller mills. A 2234

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great



He is rewriting a page that affects the lives of hundreds of thousands of people

IN A WAY, you might call this a historic moment in the life of a great city.

Without fanfare or ceremony, this farsighted sanitary engineer is helping to rewrite a sanitary code that will improve the living conditions of an entire population.

His revision will make possible the home use of a revolutionary garbage disposal unit—the General Electric Disposall.*

Thus, another public health authority is helping to write "finis" to the era of the garbage can—breeding place for germs and flies.

No, he is not alone in the crusade against filth and disease. Progressive-minded sanitary engineers in more than 300 communities have taken steps to make way for this kitchen device that shreds food waste and flushes it into the sewer *before* it can become odorous, putrefactive garbage.

Wherever necessary, these sanitation authorities have revised antiquated sanitary codes to permit the use of Disposalls in their communities' homes.

Just as sanitary pioneers of another era helped fight epidemics, such as typhoid, by banishing the outhouse

—so, too, are these men helping to rid their communities of another "trouble spot" . . . the garbage can.

We feel certain that, once you have studied all the facts about the Disposall method, you will find it *your* answer to a garbage-free community.

You, too, will want to join the growing ranks of sanitary engineers who are helping to create a cleaner, more healthful, better America!

QUESTIONS AND ANSWERS ABOUT THE DISPOSALL METHOD OF ELIMINATING GARBAGE

1. Has the Disposall method been thoroughly tested?

Yes! Disposalls have been subjected to rigid testing in numerous research laboratories. Moreover, they have been installed in thousands of homes in more than 300 communities. Testing and actual "home" use for more than ten years have proved the efficiency and practicality of the Disposall method of eliminating garbage.

2. Will Disposalls cause sewer system stoppages?

No! The Disposall shreds food waste into such fine particles that they flow freely through the pipe lines without shoaling or settling.

These wastes are finer, more water-buoyant and uniform than sewage solids now flowing through your lines. And they are ground in a controlled amount of cold water, which congeals and homogenizes greases into a form that will not clog sewer lines.

3. Will your plant have to be expanded?

Not for many years will the number of Disposalls in your community become large enough to add appreciably to the loading on the normal treatment plant. Ultimately, even if a Disposall were installed in every home in your community, the volume of sewage flow would be increased by *less than two per cent.*

An increase in solids and organic loading on the plant will naturally result from the addition of food wastes to the sewage flow. But a great many plants will be capable of handling this increased loading for some time; others can be expanded when the loading makes this necessary.

4. Are sewage treatment plants necessary?

As a health-protective measure, there can be no question about the need for treatment plants, whether there are Disposalls in the community or not. We hope that the Disposall method will provide another incentive for building treatment plants wherever they are now needed!

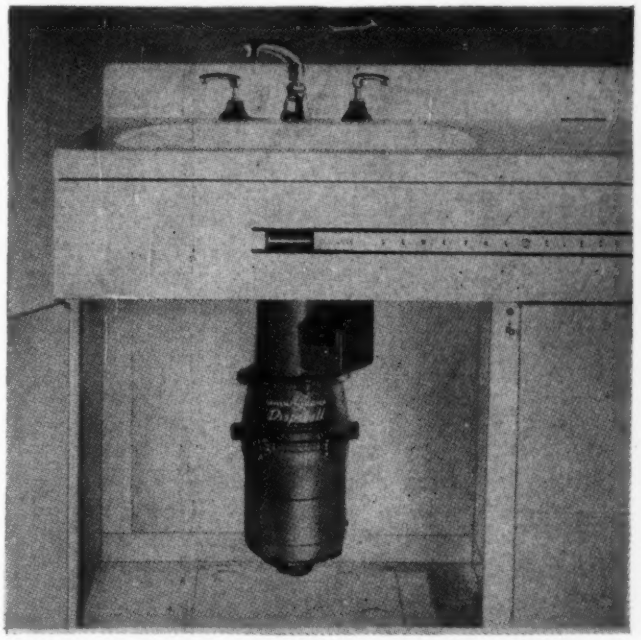
5. Why should garbage be eliminated this way?

Just as indoor plumbing replaced the outhouse, the General Electric Disposall should replace the garbage can. The Disposall removes all food waste as it should be removed—*immediately!*

Like the outhouse of yesterday, the garbage can threatens community health. It is odorous, putrefactive, germ-breeding. It attracts flies which spread those dangerous germs. *The sooner it is eliminated, the safer!*

6. Where can you get more information?

Further information about Disposalls—and the Disposall method—is yours for the asking. We shall be glad to send complete information—the result of intensive research. We shall be glad, too, to answer any specific questions you may want to ask. Please write to Department SWE 846, General Electric Company, Bridgeport 2, Connecticut.



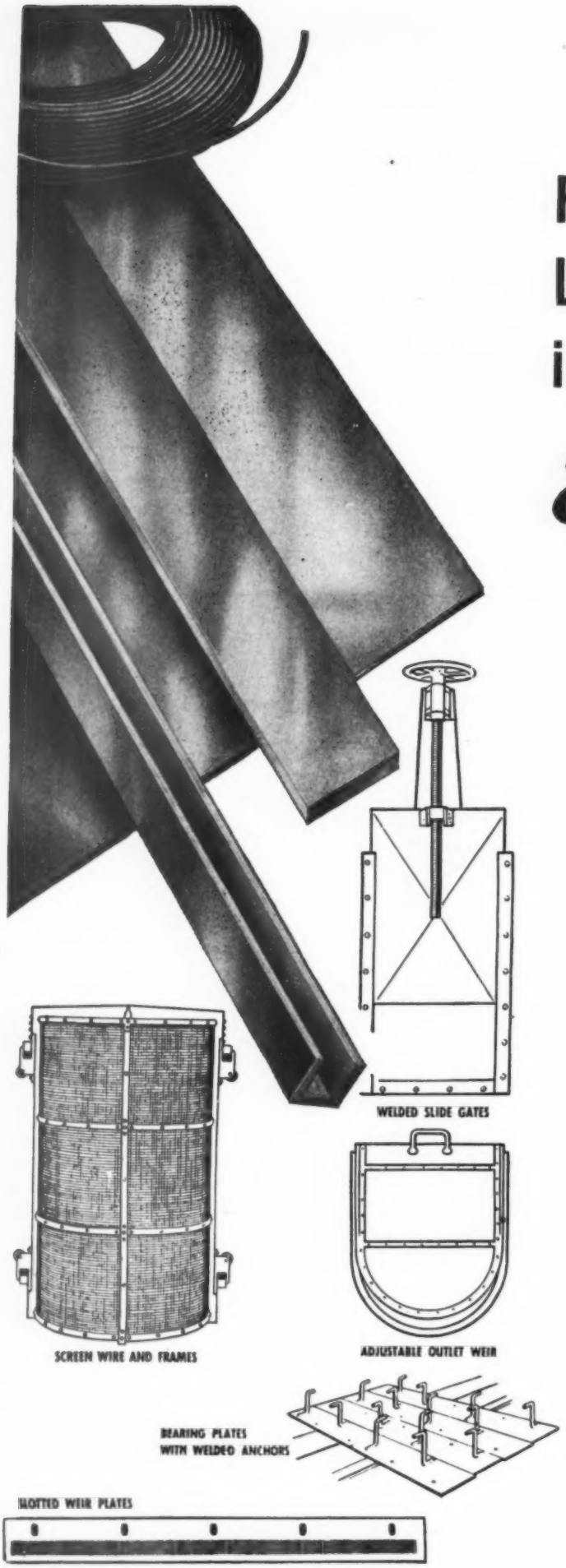
The General Electric DISPOSALL shown installed in our Electric Sink. Food wastes are scraped into drain opening and safety cover is placed in position. Cold water tap is then turned on, starting the DISPOSALL operation. Food waste is shredded and flushed away automatically.

Disposall

*TRADE-MARK REG. U. S. PAT. OFF.

CONVERTS FOOD WASTE TO SEWAGE—ELIMINATES "GARBAGE"

GENERAL ELECTRIC



For Strength and Light Weight in Built-up Equipment

Everdur Metal

EVERDUR* Copper-Silicon Alloys are produced in compositions suitable for rolling, drawing, spinning, forging and hot or cold working. Alloys are available that are suited to welded assembly of built-up equipment that is strong and durable, yet light in weight and easy to operate.

Because Everdur Metal combines high strength with the corrosion resistance of copper, it is especially well adapted to the construction of any equipment which requires an extra measure of protection against corrosion.

Proof of the economical long life provided by Everdur may be found in many waterworks and sewage plants throughout the country . . . where 20-year-old installations are still in service. The American Brass Company does not manufacture equipment, but supplies Everdur Alloys in commercial forms to leading fabricators. Write for Publications E-11 and E-5. 46215 Rev.

* Reg. U. S. Pat. Off.

ANACONDA

Everdur

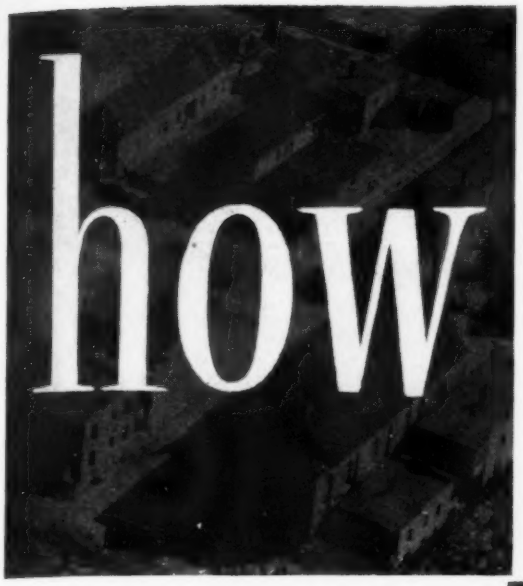
COPPER-SILICON ALLOYS

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

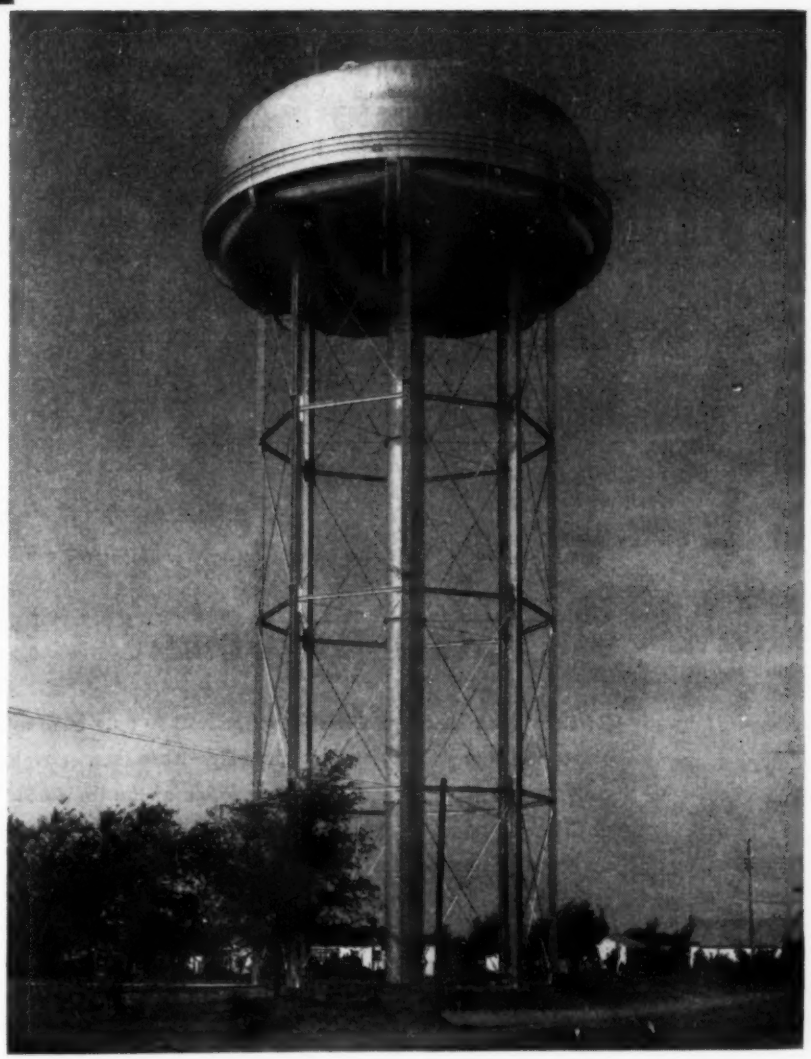


a city benefits *from* HORTON ELEVATED WATER TANKS . . . .

Many waterworks engineers consider the installation of an elevated water storage tank as the most important step in modernizing a municipal water supply. Actual reports show that *Horton* elevated water storage tanks have been the determining factor in obtaining the following benefits for cities:

- ★ More uniform water pressures throughout the distribution system.
- ★ More dependable supply of water for fire protection.
- ★ Lower insurance rating for all property in the city.
- ★ Maintainance of pressure during temporary power failures.
- ★ Lower pumping costs.
- ★ Provision for pumping during off-peak hours.

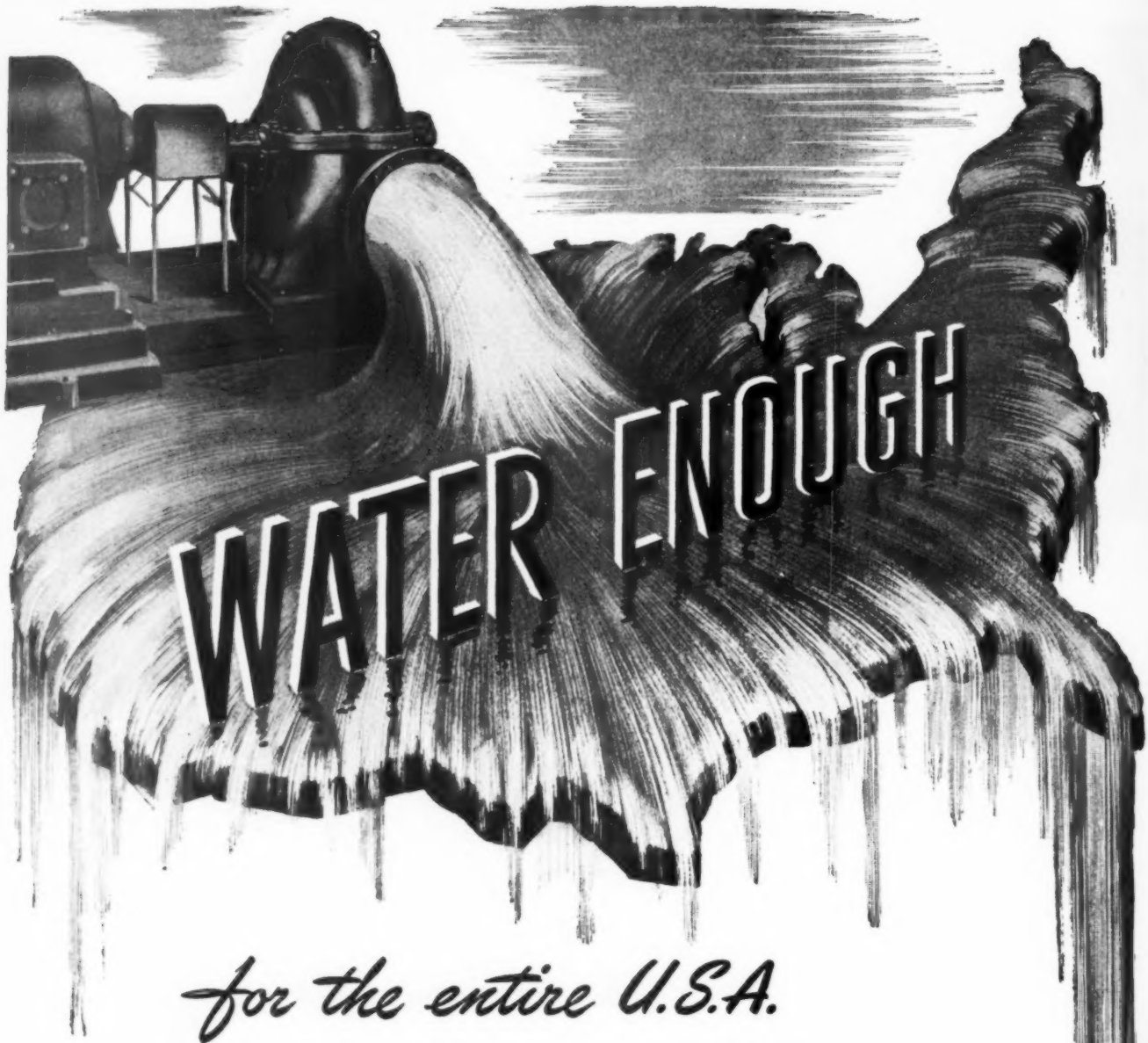
The Horton elevated tank shown at the right holds 500,000 gals. and is 112 ft. to bottom. It was recently erected at Odessa, Texas.



CHICAGO BRIDGE & IRON COMPANY

Chicago 4.....2198 McCormick Bldg.
New York 6.....3390-165 Broadway Bldg.
Cleveland 15.....2262 Guildhall Bldg.
Los Angeles 14.....1455 Wm. Fox Bldg.
Birmingham 1.....1586 North 50th St.
Atlanta 3.....2181 Healey Bldg.
Plants in Birmingham, Chicago and Greenville, Pa.

Tulsa 3.....1646 Hunt Bldg.
Houston 1.....5615 Clinton Dr.
Philadelphia 3.....1644-1700 Walnut Street Bldg.
Havana.....402 Abreu Bldg.
San Francisco 11.....1283-22 Battery Street Bldg.
Detroit 26.....1551 Lafayette Bldg.
In Canada: Horton Steel Works, Limited, Fort Erie, Ont.



for the entire U.S.A.

SUPPLIED BY DE LAVAL PUMPS

De Laval centrifugal water works pumps built to date have a total capacity of approximately 20 billion gallons daily—more than enough to supply all water requirements of the entire population of the United States. The City of Chicago, alone, is served by De Laval pumps having a total capacity of over one billion gallons daily; St. Louis, six hundred million; Cleveland, seven hundred million; Philadelphia, three hundred million; and so on down the list. In fact, 78% of all American cities of over 100,000 population are served by De Laval water works pumps.

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4111 R

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

Laboratory—Three Rivers Filtration Plant

P. G. Fulkerson, Chief Chemist
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Leo R. Mathews, Supt., Three Rivers Filtration Plant

Sterilizing a main with Sanitation HTH

For 12 years, the Fort Wayne Water Works has used HTH for sterilizing new or extended mains...for decontaminating broken mains before re-use. Liberal use of this dependable product for such purposes minimizes the possibility of contamination where surface water drainage is a factor.

HTH has long been a favorite everywhere. The reason? It satisfies the demand for *complete* protection . . . pleases water works officials who want a dependable chlorine carrier for regular, special or emergency chlorination.

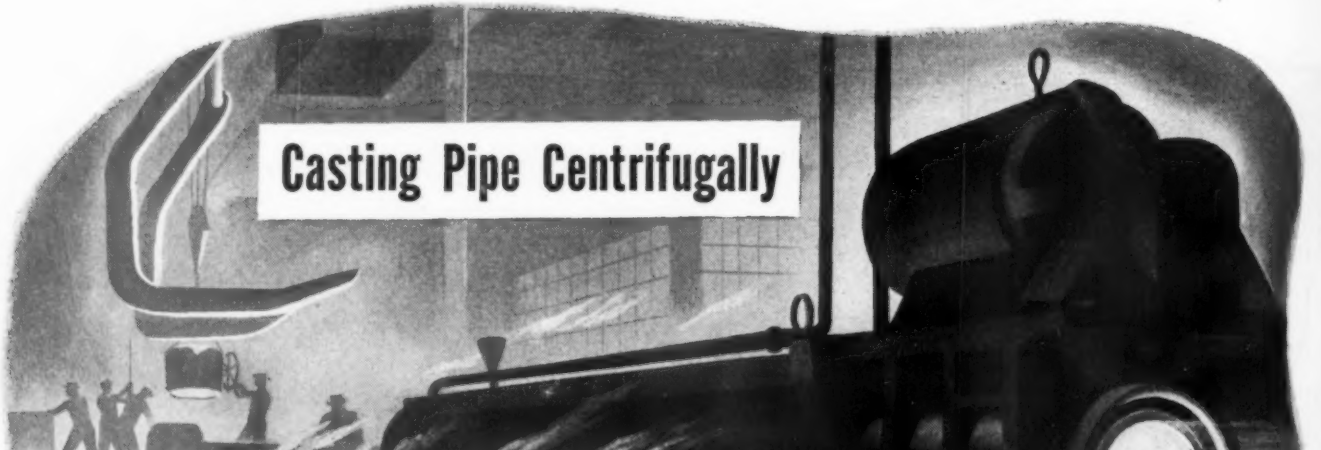
To show the scope of Sanitation HTH, Mathieson offers water works men a free illustrated copy of "Hypo-Chlorination of Water." Send for this booklet—you'll read it! THE MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York 17, N. Y.

Mathieson
SANITATION HTH

Sanitation HTH is available in cases of nine 5-lb. cans and in 100-lb. drums.

Sanitation HTH . . . . Liquid Chlorine . . . . Chlorine Dioxide . . . . PH-Plus (Fused Alkali) Caustic Soda . . . . Soda Ash . . . . Bicarbonate of Soda . . . . Ammonia, Anhydrous & Aqua Dry Ice . . . . Carbonic Gas . . . . Sodium Chlorite Products . . . . Sodium Methylate

BETTER PRODUCTION CONTROL



THE great majority of cast iron pressure pipe produced today is cast centrifugally in metal or sand-lined molds.

When this mechanized process was introduced 25 years ago, its potentialities for improved production controls were evident. For human fallibility was largely replaced by machine accuracy based on scientific principles.

The improved production controls made possible by the centrifugal casting process have long since been realized. Hundreds of millions of feet of centrifugally-cast-iron pressure pipe are now in service. All of this pipe is more uniform in metal structure, in wall thickness, and in concentricity, than pipe not centrifugally cast.

Better production control means better pipe; it results in greater uniformity of quality.

Production controls in cast iron pipe foundries start almost literally from the ground up with inspection, analysis and testing of raw materials; continue with constant control of cupola operation by metal analysis; and end with rigid tests of the finished product.

CAST IRON PIPE

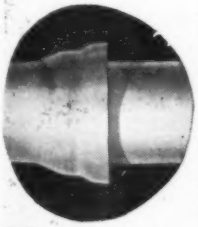
MEANS STILL BETTER PIPE

By metallurgical controls and tests of materials, our members are able to produce cast iron pipe with exact knowledge of the physical characteristics of the iron before it is poured into the mold of a centrifugal casting machine.

It must be obvious that this is vastly better pipe than cast iron pipe made by the rule-of-thumb methods of a century ago, even though most of that pipe is still in service.

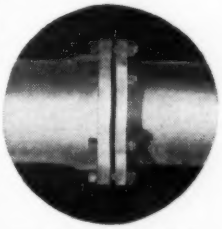
"Cast iron pipe not only offers a century or more of efficient life as a structure—it offers a century or more of efficient life as a carrier. In the limited areas with tuberculating waters, cement-lined cast iron pipe is tuberculation-proof and insures high carrying capacity for the life of the pipe. In the greatly predominating areas without tuberculating waters, the carrying capacity of unlined cast iron pipe remains practically unimpaired for the life of the pipe."

Joints for Cast Iron Pipe



Bell-and-Spigot Joint: the standard joint for water and sewerage service.

A variety of joints are available, of which the two most widely used are illustrated. Special purpose joints, such as the Ball-and-Socket, or Flexible Joint for underwater use, and the Flanged Joint for above-ground use, are also available.



Mechanical Joint: bottle-tight and flexible, now with interchangeable parts.

PUBLIC WATER SUPPLY —the Forgotten Industry

The public takes piped running water for granted—until it's turned off. A good public water supply is never news—except on the rare occasion when something goes wrong. To help create public awareness of the service rendered by America's water supply systems, the Cast Iron Pipe Research Association is presenting little known facts about public water supply to the *six million* influential readers of "Time" and "Nation's Business." For example, the following illustration and excerpts from a current advertisement:

take no chances with fire

When even a brush-fire seems likely to get out of control, run (don't walk) to the nearest telephone or alarm box! Millions in fire losses, and thousands of lives, might have been saved by reporting small fires promptly. Your public water supply system provides, in addition to home and industrial needs, sufficient water to control fires. Over half of the cost of the average water supply system results from the necessity of providing fire protection.

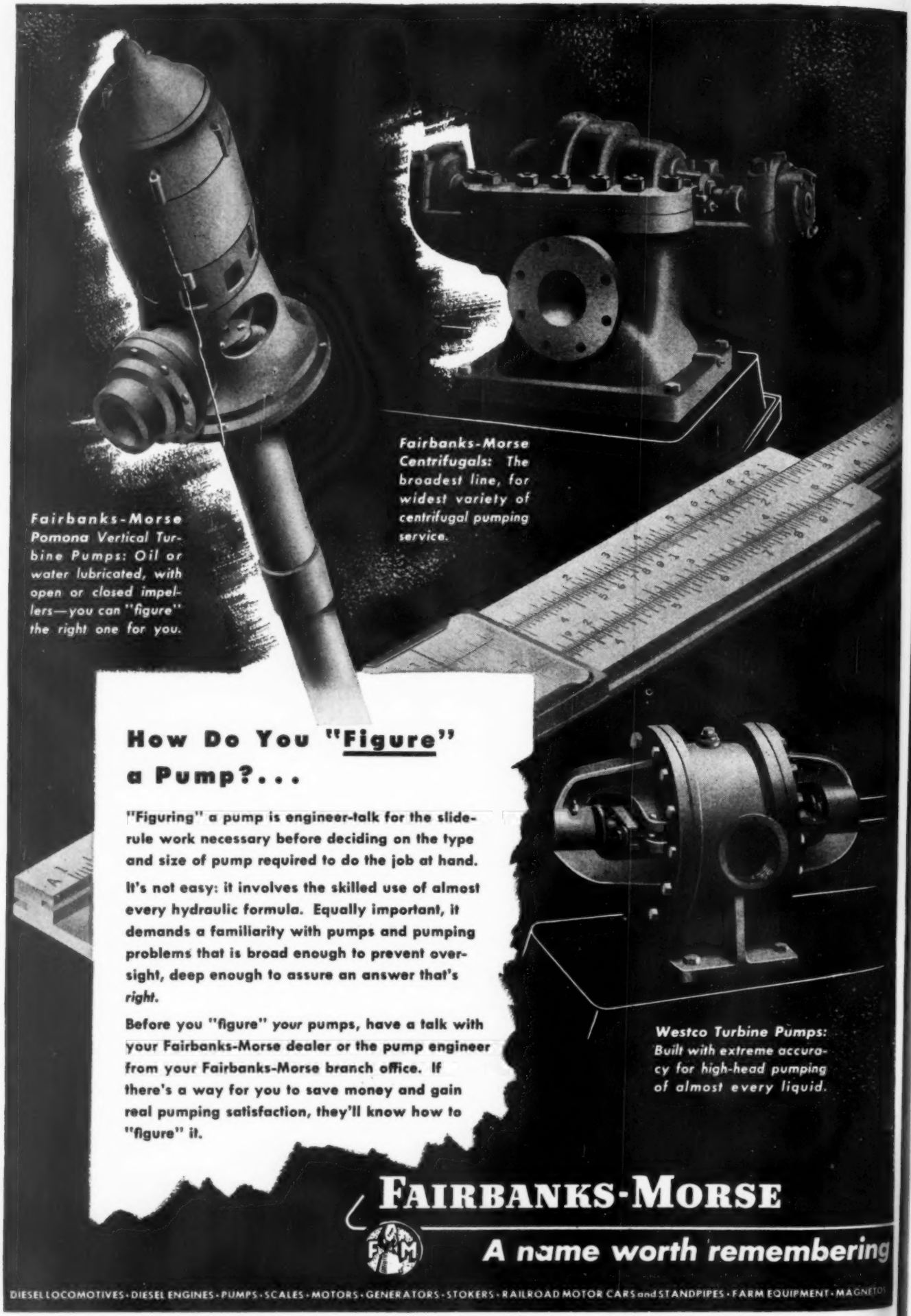
By farsighted planning and efficient round-the-clock service, your public water supply system guards your health, life and property. Give it an occasional appreciative thought.

● ● ●

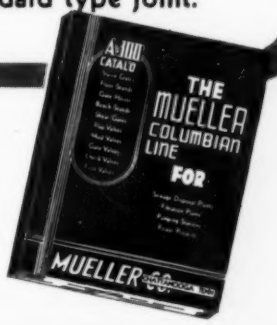
Because of its reliable, long-lived service, cast iron pipe is used for water mains in the fire-fighting systems of America's large cities.

Cast Iron Pipe Research Association, T. F. Wolfe, Engineer, 122 S. Michigan Avenue, Chicago 3, Ill.

SERVES FOR CENTURIES


Fairbanks-Morse Pomona Vertical Turbine Pumps: Oil or water lubricated, with open or closed impellers—you can "figure" the right one for you.
Fairbanks-Morse Centrifugals: The broadest line, for widest variety of centrifugal pumping service.
How Do You "Figure" a Pump?...
"Figuring" a pump is engineer-talk for the slide-rule work necessary before deciding on the type and size of pump required to do the job at hand.
It's not easy: it involves the skilled use of almost every hydraulic formula. Equally important, it demands a familiarity with pumps and pumping problems that is broad enough to prevent oversight, deep enough to assure an answer that's right.
Before you "figure" your pumps, have a talk with your Fairbanks-Morse dealer or the pump engineer from your Fairbanks-Morse branch office. If there's a way for you to save money and gain real pumping satisfaction, they'll know how to "figure" it.
Westco Turbine Pumps: Built with extreme accuracy for high-head pumping of almost every liquid.
FAIRBANKS-MORSE
A name worth remembering
DIESEL LOCOMOTIVES · DIESEL ENGINES · PUMPS · SCALES · MOTORS · GENERATORS · STOKERS · RAILROAD MOTOR CARS and STANDPIPES · FARM EQUIPMENT · MAGNETOS

Mueller Gate Valves are valuable factors which modern engineers and sewage officials are using to step up efficiency and reduce costs in the operation of sewage and filtration plants. These AWWA or Low Pressure Gate Valves have parallel seats, double discs and FOUR POINT wedging action where the pressure is applied equally at 4 points near the edges of the disc. Because they are precisely manufactured from the finest of materials, they assure smooth operation, high resistance to wear, and low maintenance costs. They can be furnished with spur or bevel gearing, with or without by-pass valve and with ends to fit any standard type joint.



Whether you are building a new plant, modernizing, or making additions to your present facilities, be sure to have a copy of the Mueller A-300 Catalog at your elbow. It shows many typical installations, helpful diagrams and gives a full description of the Mueller Line. If you haven't a copy, write us today.

MUELLER CO.

FACTORY: *Chattanooga, Tenn.* MAIN OFFICE AND FACTORY: *Decatur, Ill.*
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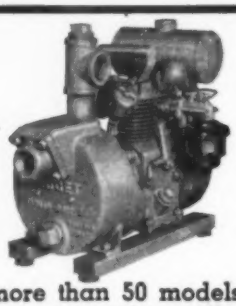
NEW SANITARY CLEANER MEETS PUBLIC HEALTH STANDARDS

THE MIDGET



Smallest of more than 50 models of Gorman-Rupp centrifugal pumps, the Midget can do hundreds of handy pumping jobs. Small, compact – weighs only 60 pounds complete – easily handled by one man. Automatic self-primed – when the motor starts, the water starts. Streamlined interior can't clog. Pumps more water for its size than any other pump on the market.

Whatever size your pumping job may be, up to 125,000 gals. per hour, your best choice is Gorman-Rupp.

Gorman-Rupp Model 1602 (90M) pump, capacity 1500 GPM at average total head.

HERE'S A GOOD BUSINESS FOR SOMEONE IN YOUR TOWN!

Public Health Officials - Show this Announcement to Sanitary Service Operators in Your Community!

The New Odorless Sanitary Cleaner is modern apparatus for cleaning septic tanks, vaults and cisterns. It is complete in every respect. It is shipped ready to mount on standard truck chassis, 158 to 161 inches length. It is built by the Gorman-Rupp Company, a leader in the pump industry.

This O. S. C. unit is approved by public health officials because it eliminates old-style, makeshift equipment – often open tanks, diaphragm hand pumps and even shovels. With an O. S. C., cleaning the septic tank is as casual and efficient as any other household service.

The O. S. C. has a powerful Gorman-Rupp Centrifugal Sewage Pump of self-priming design. Septic tanks of 500 gallon size are cleaned in 15 minutes; 1,000 gallon size in 20 minutes. A 25,000 gallon septic tank was cleaned in just 10 hours.

It's water-tight, fly-proof and entirely enclosed. A boon to operators now in business. A real opportunity for the veteran wanting his own business. Buy an O. S. C. unit under the G. I. Bill of Rights.

For further information and descriptive literature write

THE GORMAN-RUPP COMPANY

GORMAN-RUPP PUMPS — UNSURPASSED FOR PUMPING FAST

FOR EFFECTIVE SEWAGE AERATION

ALOXITE Diffusers provide

- UNIFORMITY OF STRUCTURE
- RUGGEDNESS
- LOW PRESSURE LOSS
- CORROSION RESISTANCE
- DURABILITY

In over 225 plants—with operative installations dating back to 1932—ALOXITE aluminum oxide porous media prove all claims made for them.

Used in various phases of primary and secondary sewage treatments, these tubes and plates assure continuous uniform air supply. Diffused in smaller bubbles, oxygen absorption is higher. More efficient treatment results.

With reasonably clean air supplies, rate of pore clogging is greatly retarded. *Some operators report no diffuser removal for cleaning necessary even after more than ten years service!* This is effected, in part, by the uniform permeability and smooth pore passages of the tubes and plates. "Quiet" diffusers are revived quickly by any of the accepted cleaning methods, such as acid treatment, chlorination, brushing, reburning, etc. Withstanding repeated handlings, these rugged media are used over and over again. Structural deterioration is averted by exceptional corrosion resistance.

Available to advise on specifications, installation and operation of ALOXITE diffusers is an engineering staff familiar with the sewage field. Their background of technical and practical experience may be of invaluable assistance to you. Feel free to consult them. Write Dept. O-67, The Carborundum Company, Refractories Division, Perth Amboy, N. J.

DIFFUSER MEDIA

BY CARBORUNDUM

TRADE MARK

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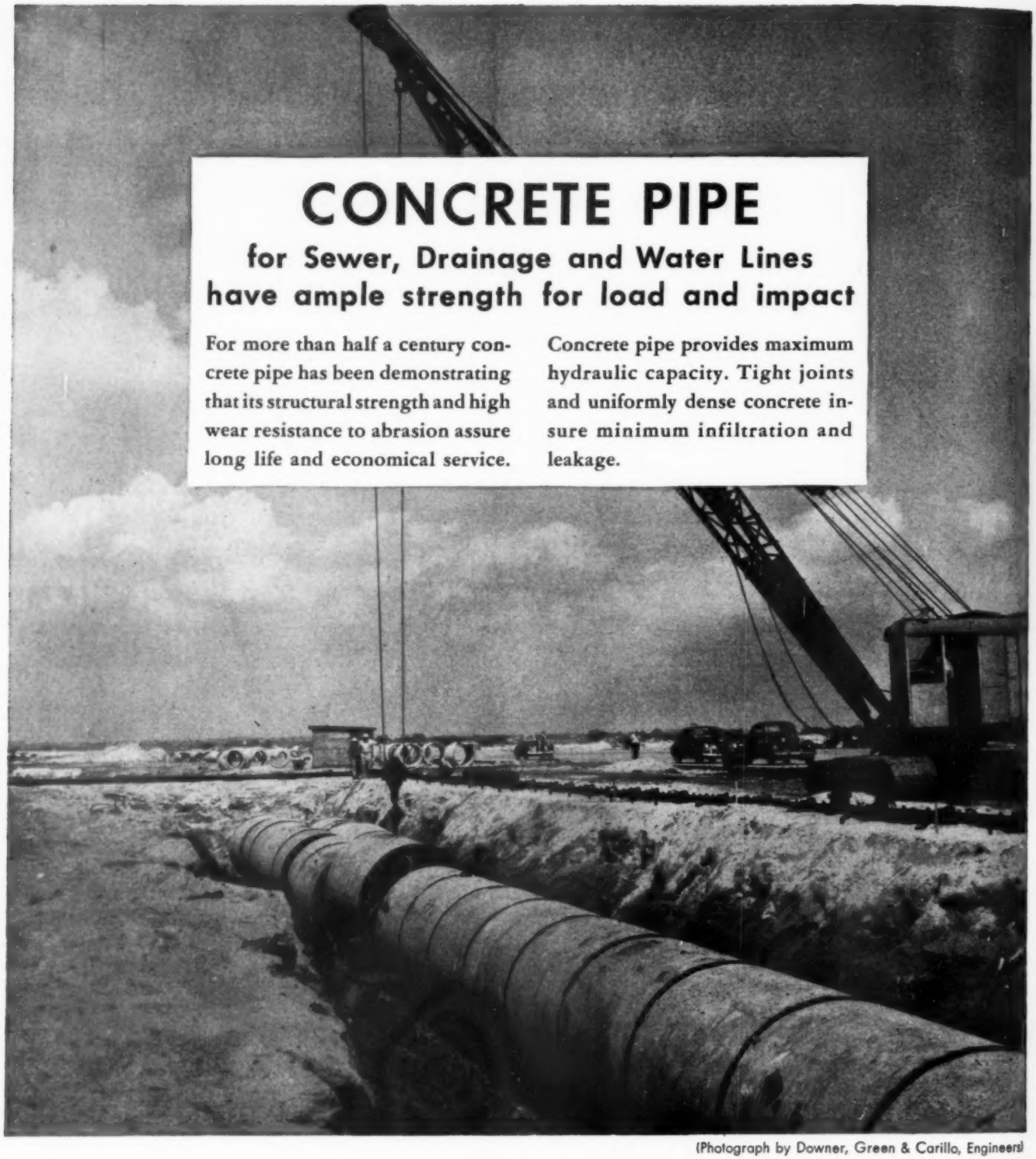


CONCRETE PIPE

for Sewer, Drainage and Water Lines have ample strength for load and impact

For more than half a century concrete pipe has been demonstrating that its structural strength and high wear resistance to abrasion assure long life and economical service.

Concrete pipe provides maximum hydraulic capacity. Tight joints and uniformly dense concrete insure minimum infiltration and leakage.

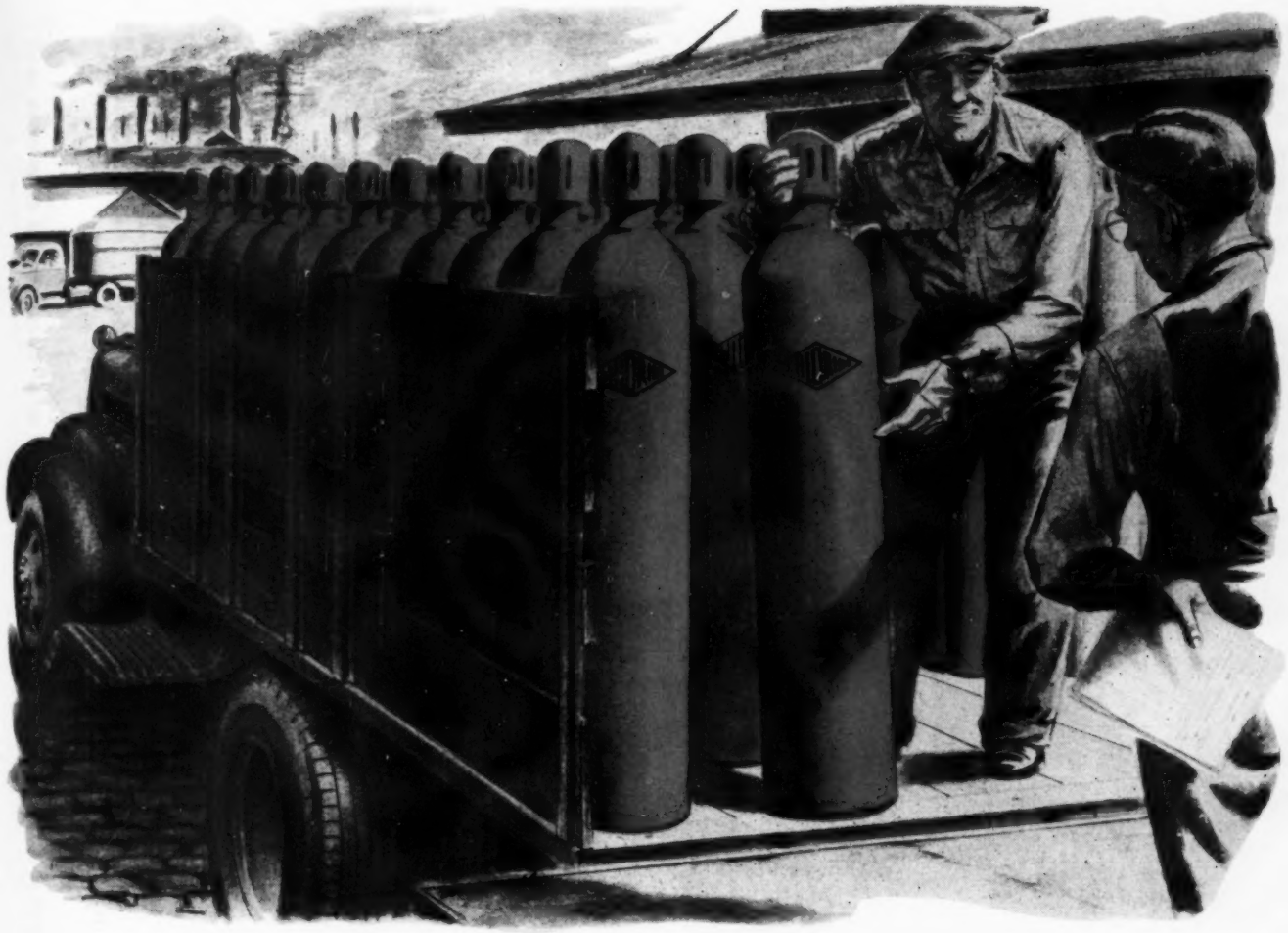
(Photograph by Downer, Green & Carillo, Engineers)

The new extension to the outfall effluent sewer line from the Jamaica Bay sewage disposal plant of New York City was constructed with 84-in. reinforced concrete pipe laid over a continuous mat of reinforced concrete. The extension was necessary because one of the runways for New York's Idlewild Airport was built across the existing sewer discharge.

At maximum depth the concrete sewer line was laid 30 ft. below high tide. Downer, Green & Carillo, consulting engineers.

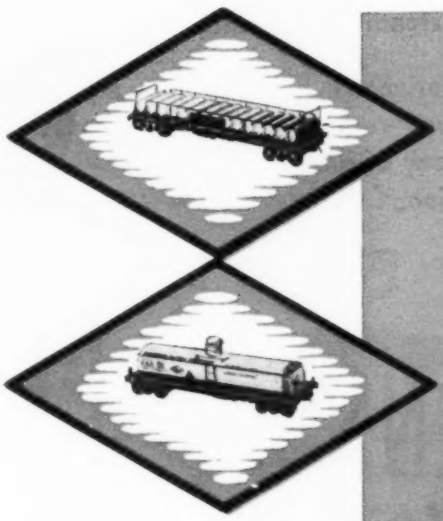
AMERICAN CONCRETE PIPE ASSOCIATION

228 NORTH LASALLE STREET, CHICAGO 1, ILLINOIS



DIAMOND *Liquid* CHLORINE

Furnished in cylinders



multi-unit cars, or
tank cars, to meet
your requirements

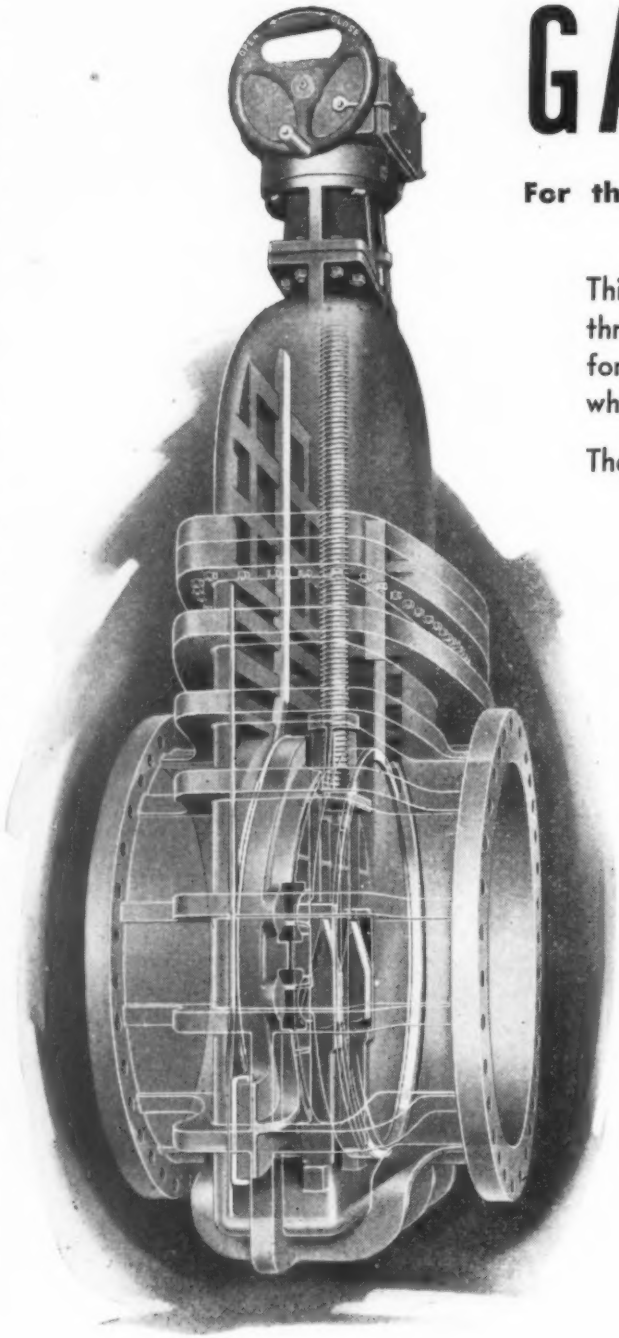
DIAMOND ALKALI COMPANY

PITTSBURGH 22, PA. *and Everywhere*

CHLORINE

RENSSELAER *"Square Bottom"* GATE VALVES

For the most severe service conditions



48" Valve with Motor Operator

This construction provides three point support throughout the length of gate travel. It is ideal for valves subject to throttling service or wherever appreciable differentials in head exist.

They are very popular as Wash Water valves.

Conceived by RENSSELAER in 1916, this design has received widespread acclaim and the flattery of much imitation.

To avoid unsuitable substitutes, check these points:

1.—Stainless steel or bronze gate shoes.

2.—Stainless steel or bronze side tracks—continued up into bonnet.

3.—Heavy bronze center guide—extending down into case.

4.—Experience in building these valves requiring high accuracy of design and fabrication.

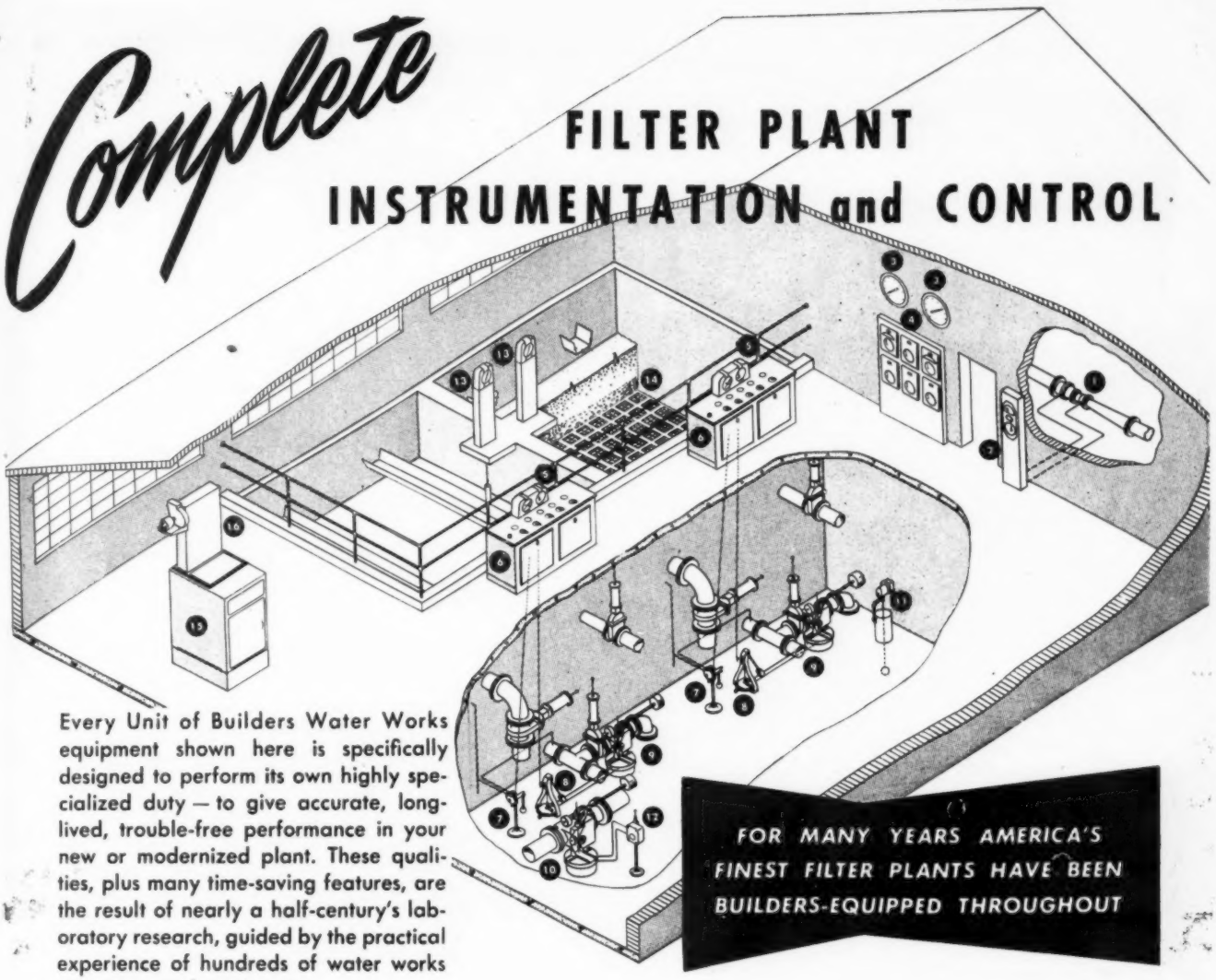
There has never been developed an effective substitute for good material and workmanship backed by sound design.

"Ask the man who uses RENSSELAER"

RENSSELAER VALVE CO.

TROY, N. Y.

Complete FILTER PLANT INSTRUMENTATION and CONTROL



Every Unit of Builders Water Works equipment shown here is specifically designed to perform its own highly specialized duty — to give accurate, long-lived, trouble-free performance in your new or modernized plant. These qualities, plus many time-saving features, are the result of nearly a half-century's laboratory research, guided by the practical experience of hundreds of water works operators and engineers.

FOR MANY YEARS AMERICA'S FINEST FILTER PLANTS HAVE BEEN BUILDERS-EQUIPPED THROUGHOUT

1. Herschel Standard Venturi Tube for Raw or Filtered Water.
2. Type M Register-Indicator-Recorder.
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5. Loss of Head and Rate of Flow Gauges.
6. Filter Operating Table with Hydraulic controls and valve position indicators.
7. Diaphragm Pendulum Unit for Loss of Head Gauge.
8. Diaphragm Pendulum Unit for Rate of Flow Gauge.
9. Venturi Filter Effluent Rate Controller.
10. Venturi Wash Rate Controller.
11. Chronoflo Transmitter for Clearwell Gauge.
12. Chronoflo Transmitter for Wash Water Gauge.
13. Sand Expansion Gauge.
14. Wheeler Filter Bottom.
15. Omega Gravimetric Dry Chemical Feeder with automatic proportional control from Raw Water Meter.
16. Omega Dust Remover.

For Bulletins, address BUILDERS-PROVIDENCE, INC., (Division of Builders Iron Foundry)
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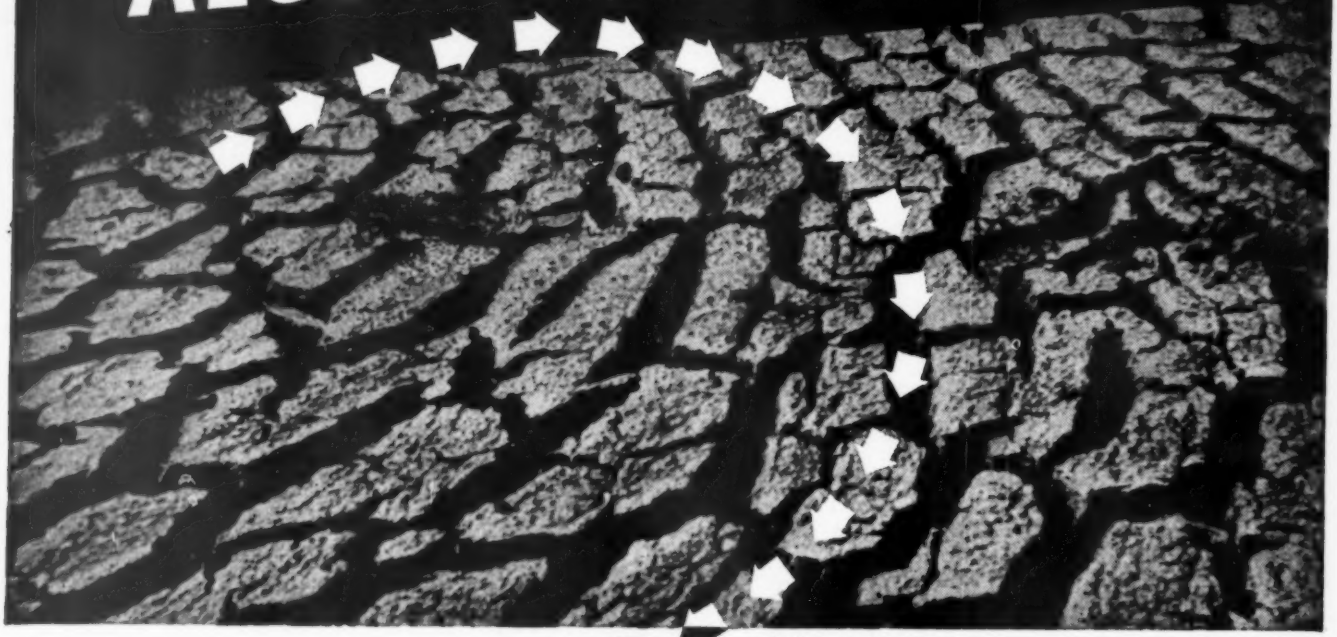
BUILDERS PRODUCTS

Venturi, Propeloflo and Orifice Meters • Type M and Flo-Watch Instruments • Venturi Filter and Wash Water Controllers and Gauges • Master Controllers • Kennison Nozzles • Chronoflo Telemeters • Conveyoflo Meters Wheeler Filter Bottoms • Filter Operating Tables

BUILDERS PROVIDENCE *Instruments*

GENERAL CHEMICAL ALUMINUM SULFATE



Well cracked sludge bed shortly after Aluminum Sulfate treatment.

SPEEDS SLUDGE DRYING

General Chemical Alum speeds sludge dewatering and drying on sand beds . . . capacity of beds may be doubled, even tripled . . . quick removal lessens chance of odor nuisance . . . reduced volume of cake decreases cost of removal. Sewage works operators the nation over count on the benefits obtained from Alum treatment throughout the year.

Why not learn what General Chemical Alum will do in your plant too? Full information may be obtained quickly from the nearest General Chemical Sales and Technical Service Office listed below.

BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

FOR AMERICAN INDUSTRY

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In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

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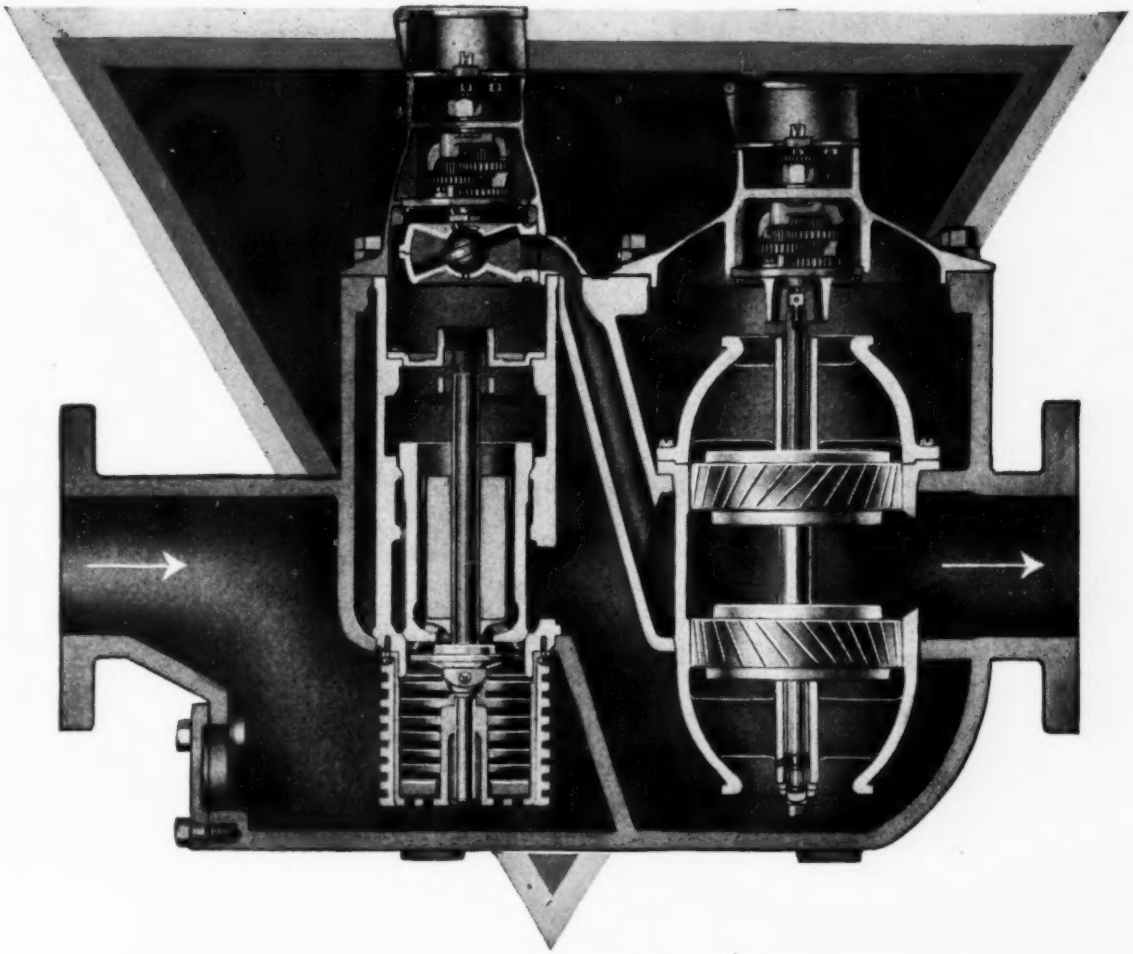

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BADGER COMPOUND METERS HAVE NO EQUAL

The installation of a Badger Compound Meter is positive assurance that maximum revenue will be secured. Years of service have proven the soundness of the engineering principles incorporated into Badger Compound Meters. Let a Badger engineer assist you with your large consumer problems. It will pay dividends.

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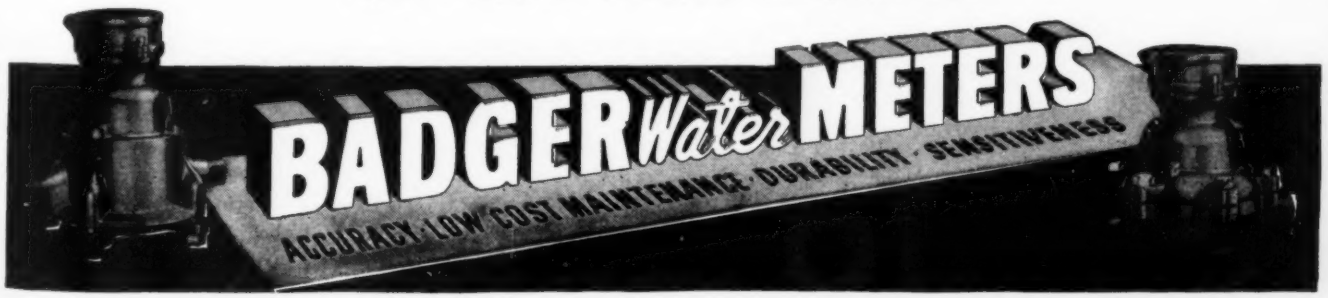
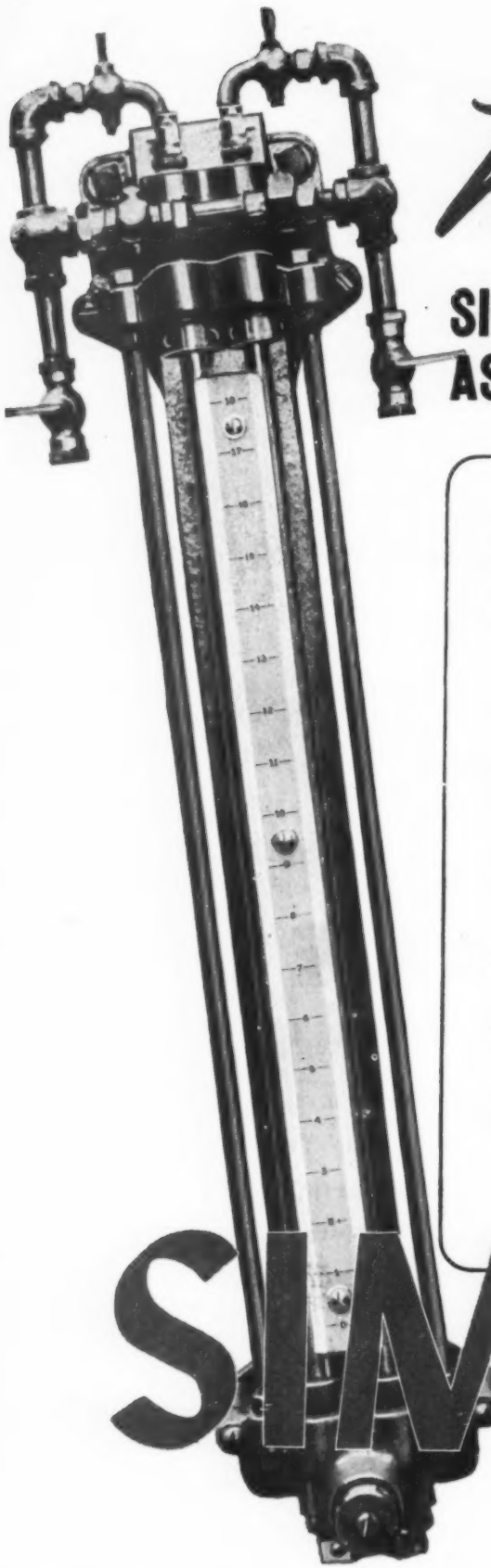




here's how

SIMPLEX TYPE MAP MANOMETERS ASSURE MEASUREMENT ACCURACY!

Be sure of accuracy — with a Simplex Type MAP Manometer! This unit has been designed especially to meet the high standards of laboratory technicians, test floor engineers, and other industrial users *where accuracy is a "must"!* Here are six of the special features of the Type MAP Manometer:

1. ***Large-diameter gauge glasses*** with accurately bored interior surfaces tending to produce a flattened meniscus!
2. ***Highly accurate scale*** permitting deflection readings of 1/100 of an inch!
3. ***Mercury dampening valve*** — essential in removing oscillations caused by line surges!
4. ***Mercury drain and filling plugs*** — for quick addition or removal of balancing liquid!
5. ***Air venting valves*** — for instant removal of air accumulations!
6. ***All-important equalizing valve*** — to enable checking and testing of instrument in place—at any time.

Want installation, operation facts? Write for free, illustrated copy of BULLETIN 200

SIMPLEX

TYPE MAP MANOMETERS
for application with Venturi Tubes, Flow Nozzles, or Orifice Plates.

SIMPLEX VALVE & METER COMPANY
6743 UPLAND STREET, PHILADELPHIA 42, PA.

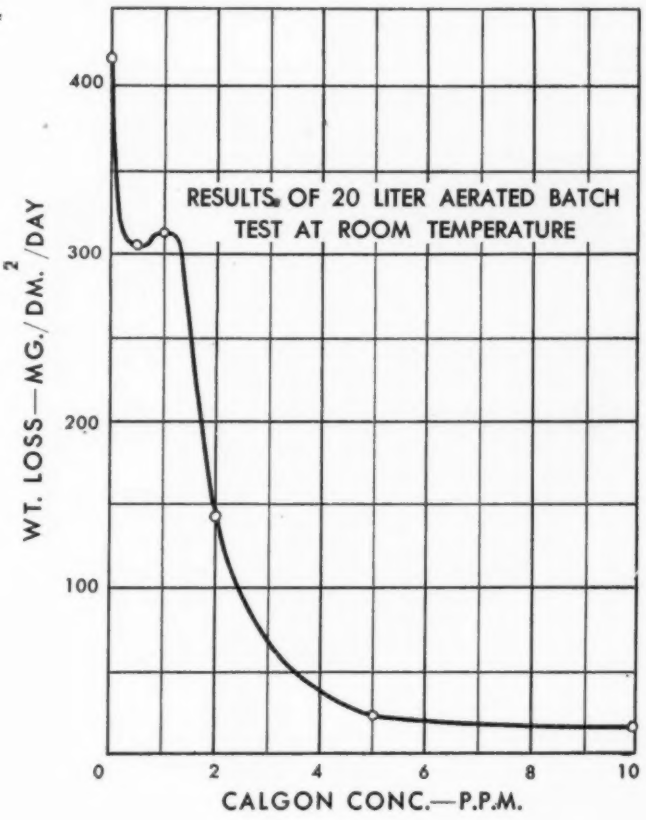
Calgon* Controls Corrosion

This graph illustrates the effect of various concentrations of Calgon in inhibiting steel corrosion.

The peculiar hump in the curve was confirmed by several duplicate tests. It may be due to the coagulating effect of a very low concentration of Calgon, which might produce a slight increase in the protective action of the rust film. At higher concentrations a peptizing action is obtained.

This curve was obtained from 20-liter aerated batch tests at room temperature. In continuous or intermittent flow systems, comparable results are obtained with lower concentrations of Calgon. In actual service, optimum concentration may be higher or lower than the curve indicates, depending on a variety of conditions.

Calgon is now used by hundreds of municipal water systems in the United States, Canada and European countries, not only for its corrosion-inhibiting property, but because it also prevents scale and eliminates "red water." Mains, distributing lines and meters are kept in better condition; consumer complaints are reduced.



The corrosion-inhibiting property of Calgon is discussed in detail in an article "Corrosion Control with Threshold Treatment" which appeared in *Industrial and Engineering Chemistry*. We will be glad to send you a reprint of this article.

* *T. M. Reg. U. S. Pat. Off.*

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING PITTSBURGH 30, PA.

"Varec" Firsts in Digester Relief Valves!

- **HYPERBOLIC STATIC-BALANCED PALLETS** insure less "blow-down."
- **PALLET GUIDES** are not exposed to corrosive vapor.
- **GREATER FLOW CAPACITY** Expanding streamlined passageways eliminate directional changes and eddying currents.
- **WIND DRIFT** is eliminated by scientific design.
- **NONMETALLIC SEATS** seal tight.
- **NONCORROSIVE AND NONELECTROLYTIC ACTION** Materials are used having best thermal, electrical potential, and noncorrosive factors in combination.
- **GREATER DURABILITY** Materials and design insure longer life.
- **REPLACEABLE SEATS** guarantee minimum maintenance expense.
- **FIELD PRE-TEST** All "VAREC" equipment is pre-tested to actual field installations.
- **FOOL PROOF** Pallet guiding system positively prevents binding or freezing.
- **NONFREEZING** Drainage throughout the unit is complete—no condensate can accumulate.
- **WEATHERPROOF** Properly protected against all kinds of weather, mud-dobbers, birds, etc.
- **TWENTY YEARS' EXPERIENCE** is built into every unit.

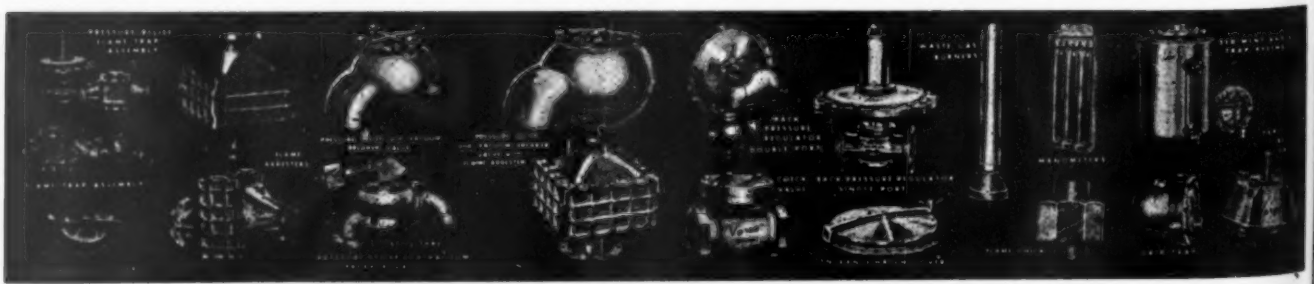
Cutaway section of "Varec" approved Pressure Relief and Vacuum Breaker Valve. Fully streamlined, with hyperbolic pallets, this valve with flame arrester vents digesters with maximum safety.

Installation photo of "VAREC" approved Pressure Relief and Vacuum Breaker Valve with Flame Arrester.

An attempt is generally made to copy the best features of a successful product in the manufacture of similar products. "Varec" has pioneered in the above listed features that have made their valves "Standard" in Digester Venting the world over. "Varec" Engineers are constantly working on new developments. Write today for assistance in specifying improved "Varec" approved Venting Equipment. "Varec" Catalog S-3 contains a wealth of photos, engineering data, charts, etc. A request on your letterhead will promptly bring a copy to you.

THE VAPOR RECOVERY SYSTEMS COMPANY
COMPTON, CALIFORNIA U. S. A.

New York City — Chicago, Ill. — Cleveland, O. — Houston, Tex.
Agencies Everywhere—Cable Address "VAREC COMPTON" All Codes



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HOLYOKE MACHINE COMPANY

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"HOLYOKE" GRAVITY AND PRESSURE

FILTERS

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REPAIR PARTS AND SERVICE

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FILTER INSTALLATION

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HOLYOKE MACHINE COMPANY

HOLYOKE, MASS.

72 lbs. "SMALLER"

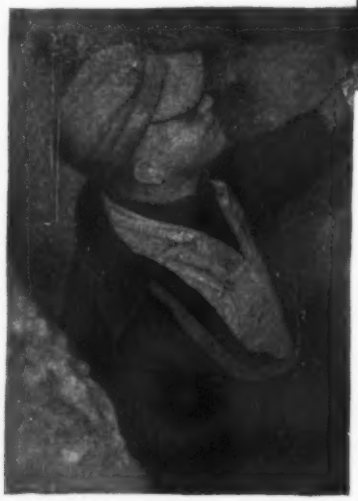
GRINNELL SOCKET FITTINGS

are easier to handle . . . cut installation time

● The 72 lb. weight advantage of this 8″ Tee is typical of the space and time saving advantages of Grinnell's compact design in its complete line of socket fittings. See the table below for a tabulation of comparable sizes and weights of other popular sizes of Tees.

Socket and spigot dimensions and wall thickness are the same as AWWA Standard Class D pipe. Friction loss is not increased. Underwriters' Laboratories approved.

Write for catalog: "Water Works Specialties". Grinnell Company, Inc., Providence 1, R. I. Branch Warehouses in Principal Cities.



TEE

	Grinnell		Competition	
	Weight	Run from bell to bell	Weight	Run from bell to bell
4″	96 lbs.	11 in.	128 lbs.	22 in.
6″	147 lbs.	13½ in.	200 lbs.	24 in.
8″	222 lbs.	16 in.	294 lbs.	26 in.
10″	325 lbs.	19 in.	395 lbs.	28 in.
12″	417 lbs.	21½ in.	512 lbs.	30 in.

GRINNELL

FOUNDED 1850

WHENEVER **PIPING** IS INVOLVED

Here are five important reasons why Transite Sewer Pipe helps reduce sewage disposal costs:

Faster Installation. Because Transite Sewer Pipe is light in weight and made in long 13-foot lengths, it is easier to handle...easier to lay this pipe to line and grade. And longer lengths mean fewer joints...faster installation.

Lower Excavation Costs. Because of its low friction coefficient (n=.010), Transite Sewer Pipe has an unusually high flow capacity. Thus, flatter grades, with correspondingly lower excavation costs, are often possible.

Use of Smaller Diameter Pipe. Instead of using flatter grades, designers sometimes take advantage of Transite's high flow capacity by selecting smaller diameter pipe.

Reduced Treatment Costs. Transite Sewer Pipe joints combine tightness with flexibility and so guard against infiltration. Tighter joints cut the load at the disposal plant...help reduce treatment costs.

Smaller Treatment Plants. Because Transite minimizes infiltration, plant capacity is more efficiently used. Where new plants are being designed, substantial savings in the initial cost of construction and equipment often may be effected.

Get full details by writing for the Transite Sewer Pipe brochure. Address Johns-Manville, Box 290, New York 16, New York.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE SEWER PIPE

Manual de
INGENIERIA SANITARIA

1946

1947 EDITION NOW IN PREPARATION
for the
LATIN AMERICAN MARKET
Second Annual Edition

The 1946 edition of this new Reference and Data Catalog, specializing in water and sewage field, was given an enthusiastic reception by Latin American engineers, public officials and equipment and supply distributors.

CULTIVATE THIS EXPORT MARKET

Water supply systems are being increased and improved. Particular attention is being given to areas along strategic highways; around airports and shipping centers. Manufacturers of supplies and equipment to serve water and sewage fields will find this export market worth cultivating.

SPECIALIZED COVERAGE

Use this publication to place your advertising message in the hands of these important men without paying for waste circulation.

WATER WORKS SUPERINTENDENTS
CONSULTING ENGINEERS
MANAGERS OF UTILITY COMPANIES
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Manual de INGENIERIA SANITARIA is designed to serve as a practical Reference and Data book for the men in Latin America charged with the problem of water supply and sanitation. It is printed in Spanish and offers access to one of greatest potential markets in the world today. The Manual is comparable to the English edition of the Reference and Data issue of Water & Sewage Works. It is a handbook of informative data and a buyers' guide.

CCA Circulation 3,369
Write for details.

Gillette **PUBLISHING COMPANY**
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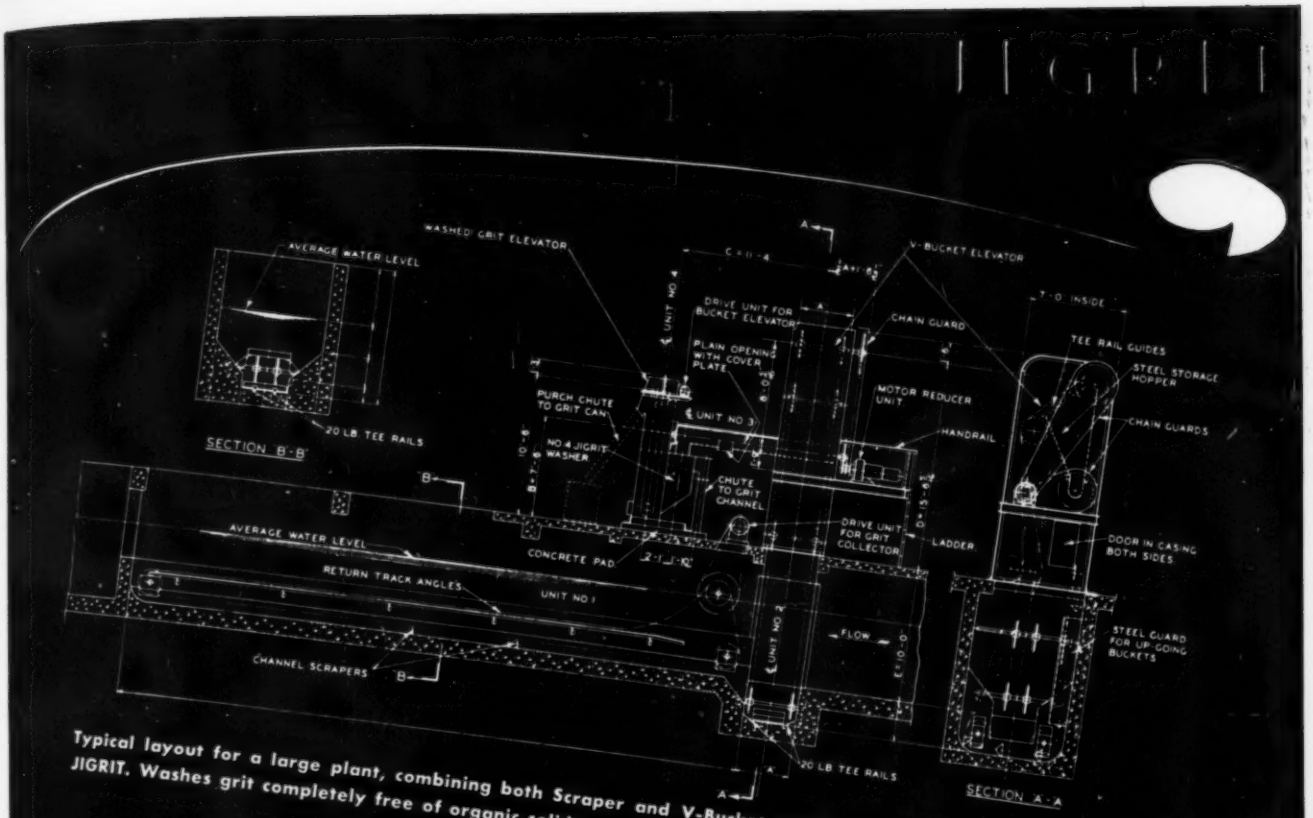
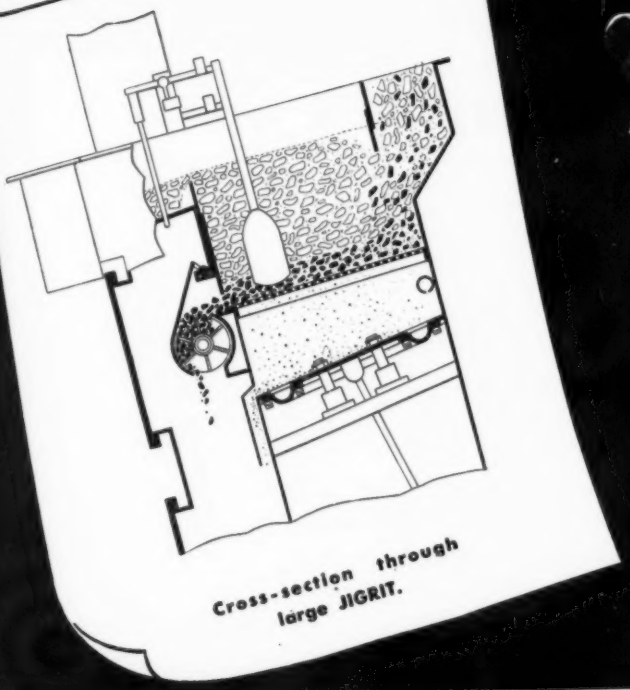
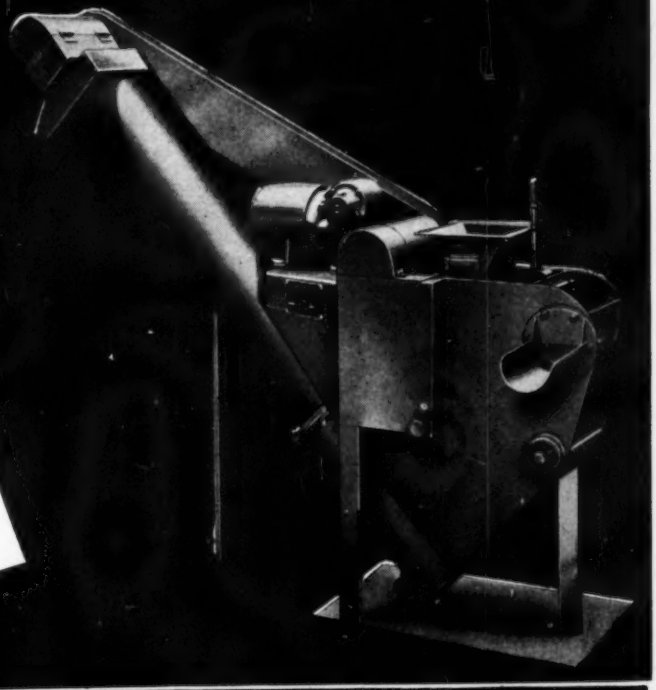


Typical layout for a large plant, combining both Scraper and V-Bucket type conveyors with a large JIGRIT. Washes grit completely free of organic solids and automatically classifies products. (Pat'd.)



Cross-section through large JIGRIT.



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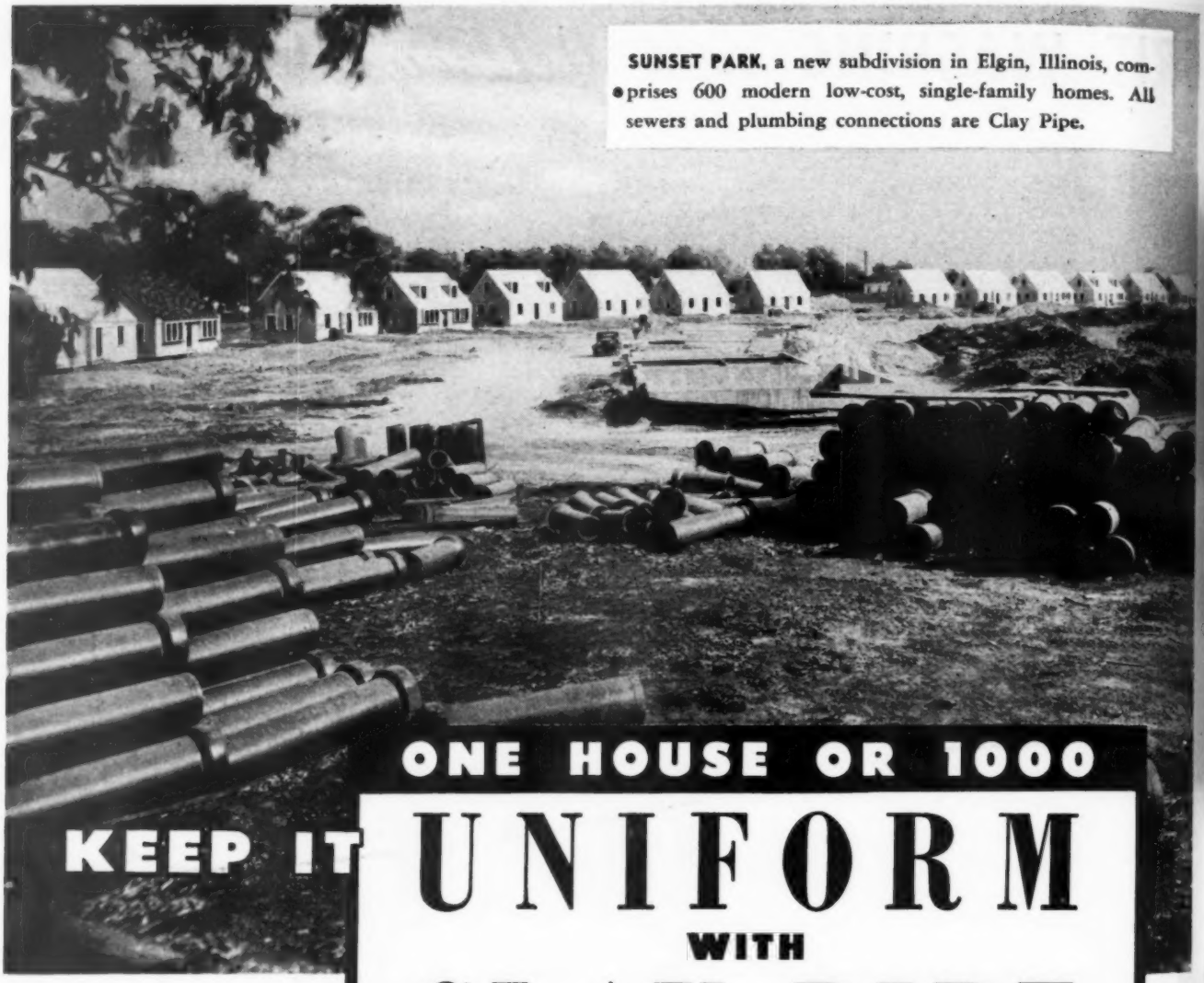
ESTABLISHED 1877



SUNSET PARK, a new subdivision in Elgin, Illinois, comprises 600 modern low-cost, single-family homes. All sewers and plumbing connections are Clay Pipe.

ONE HOUSE OR 1000

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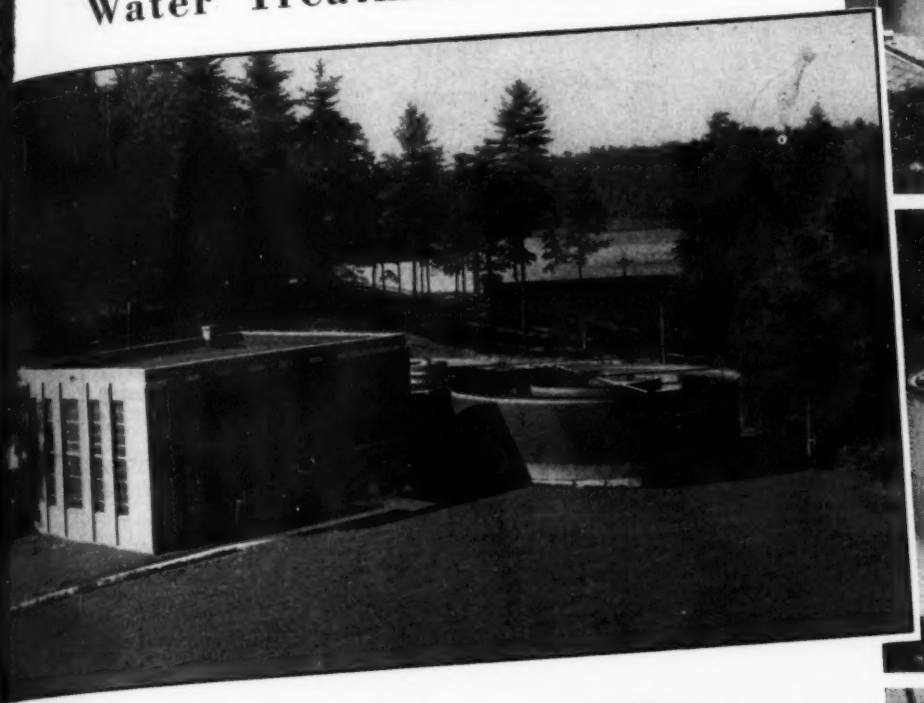

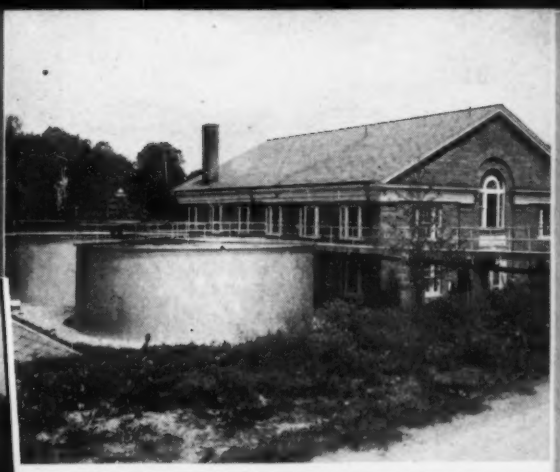

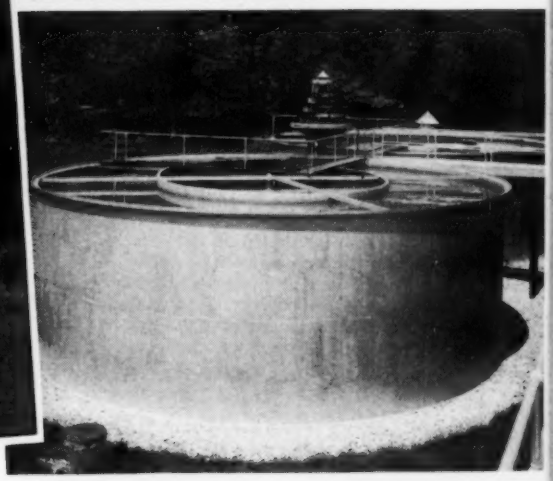

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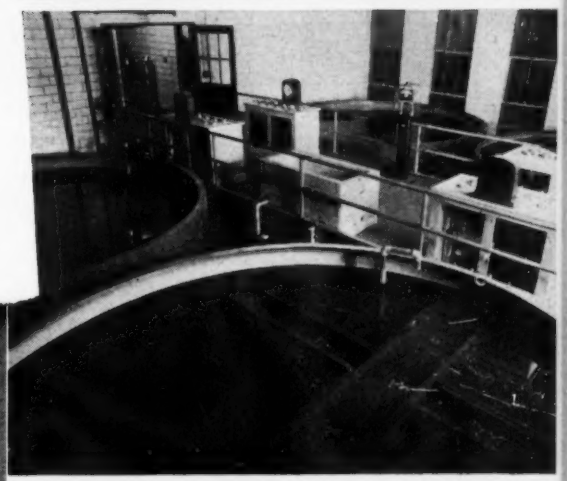

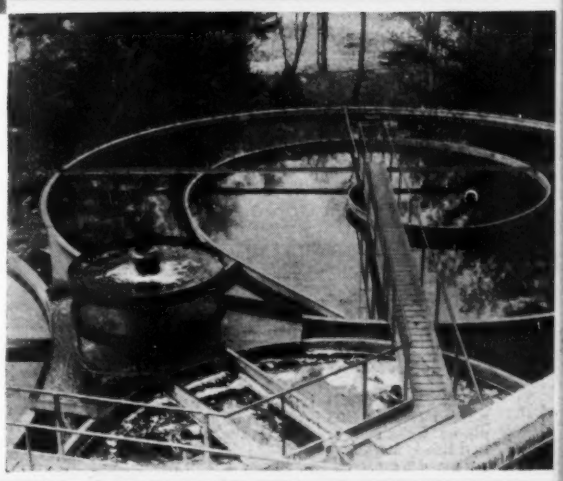

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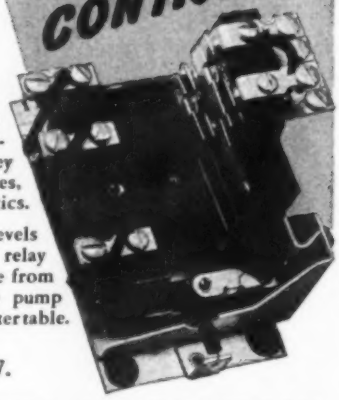

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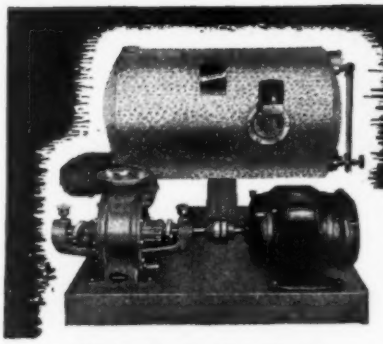

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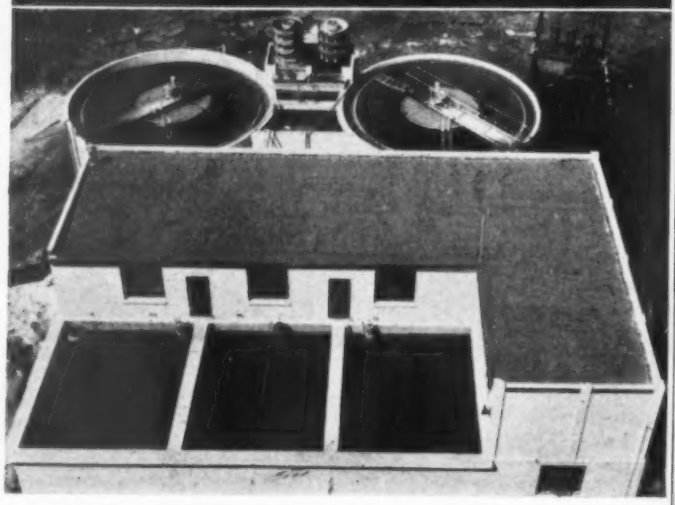

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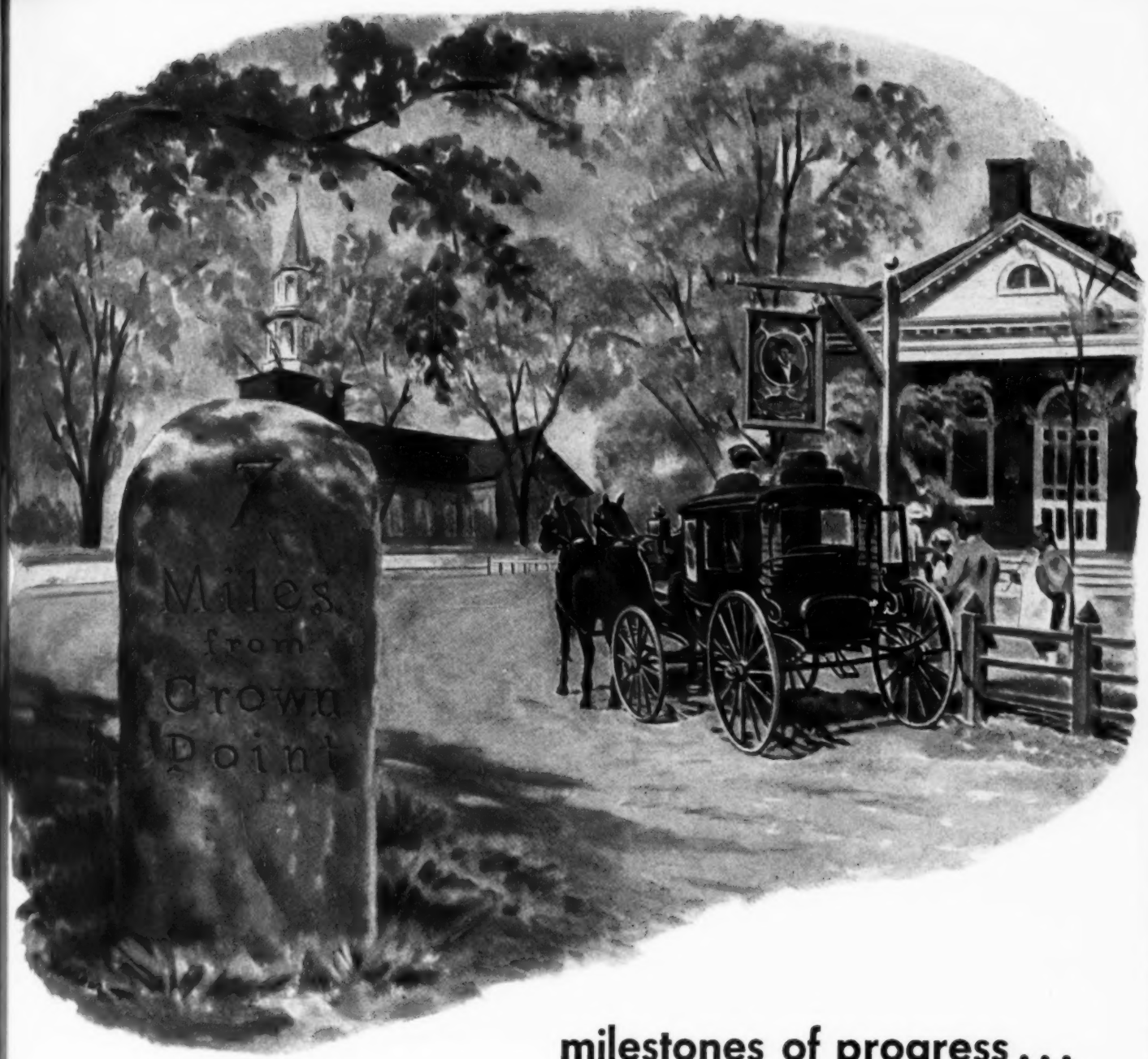

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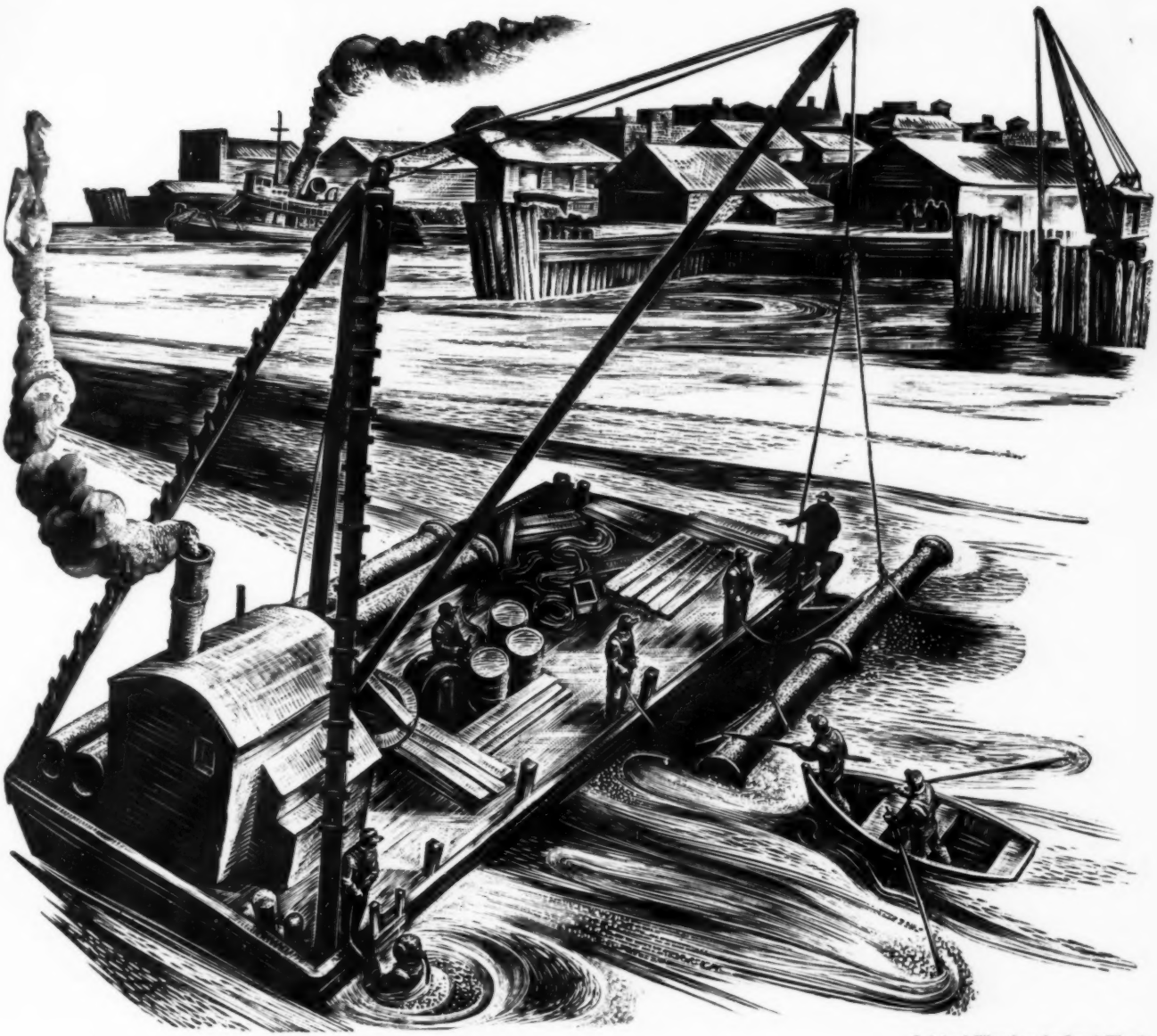

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COMING!

Storage on the Distribution System

Is a long-sought discussion and analysis of modern methods of securing water storage on the distribution system. The author shows just how much storage should be provided on the distribution system, considering both the need and the economics of providing such storage through various methods of proven value and dependability. The author, who has made many studies leading to the choice of the overall most effective and economically built and operated storage on various distribution systems, is the recently made honorary member of A.S.C.E.—

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Alvord, Burdick & Howson, Engrs., Chicago.

A Study of Costs of Making Water Main Extensions

Reveals some highly interesting facts on costs of making water main extensions over the past year or so. A comparison between letting main extensions to contract, as against the making of such extensions by the water utility force and employment of modern pipe handling, trenching, loading and backfilling machines is revealing. The evidence is clear enough to influence the cost conscious author to conclude that it is evident that future water works extensions must be made with modern machinery. This evidence comes from—

FRED J. RENY, Gen'l Mgr. & Treas.,
Portland Water District, Portland, Me.

Labor and Time Saving Through Duplicating With Modern Equipment

Tells the story of a Water and Sewerage Dept. which has an established Duplicating Division the modern equipment of which and its many and varied uses is described by—

W. R. LADUE, Chief Engr. & Supt.,
Dept. of Water & Sewerage, Akron, Ohio.

Computing Heat Losses from Sludge Digesters

On this matter of predicting or computing heat losses from sludge digesters, there is a sparsity of information. Interestingly enough, almost in the same mail was received two different articles on this important topic by authors working independently on the problem. In view of the sparsity of such information both articles have been accepted for simultaneous publication. The authors, both of the Veteran's Administration's Sanitation Unit, Washington, D. C., are—

JOHN G. MONTGOMERY and HENRY B. CANDEE,
Sanitary Engineers.

The Operation of Small Filtration Plants

Is the subject of a new series of short articles dealing with the operation and maintenance of small filtration plants by an author who has had considerable experience in filter plant and pumping station operation. The first of this new series is devoted to the part played by the laboratory in the small filter plants, the second to pumps and motors, with others to follow dealing with chemical feed, coagulation, filters, etc. The author is already known as a contributor to Water & Sewage Works—

A. E. CLARK,
Dept. of Public Works, Nashville, Tenn.

The Treatment of Some Organic Wastes

Constitutes a report of studies of the simple treatment of slaughter-house wastes and others from the production of penicillin, yeast, chewing gum, etc., by a modification of slow sand filtration. Some rather remarkable results were obtained by continuous application of the settled wastes to the sand beds after the manner of applying sewage to high-rate trickling filters. The report comes from the N. J. Agricultural Expt. Staton in a paper by—

W. RUDOLFS, Chief,
and
V. DEL GUERCIO, Research Asst.
Dept. of Sanitation, Rutgers University.

VOL. 94, NO. 6 — CONTENTS — JUNE, 1947

The Greenfield, Mass., Sewage Works....197
By Frank L. Flood
Boston, Massachusetts

Industrial Usage of Streams....203
By L. L. Hedgepeth
Richmond, Virginia

Fed. of Sewage Works Assns. Convention Program....206

Montreal Convention of Canadian Section Draws Large Attendance....207
Reported in part by H. A. Faber
Editorial Associate

Springdale's New Sewage Treatment Plant....214
By Walter Wilson
Springdale, Arkansas

Hydraulics for the Practical Water Works Man, Part 9....215
By Robert W. Angus
Toronto, Canada

Water & Sewage Patents....218

Activated Carbon Treatment of an Open Reservoir....219
By Howard E. Bailey, Boston, Massachusetts, and James Studley, Rockland, Massachusetts

Maryland-Delaware Water and Sewerage Assn. Goes to Washington....223

N. Y. University Dedicates Laboratory to the Late Professor Carpenter....227

Editorial....228

Meetings Scheduled....Ad Pages 74, 75

"Here and There" with Doc Symons....Ad Page 76

Manufacturers' and Equipment News....Ad Page 81

Literature & Catalog Reviews....Ad Page 91

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WATER & SEWAGE WORKS

VOL. 94, NO. 6 JUNE, 1947

A Gillette Publication

THE GREENFIELD, MASS., SEWAGE WORKS*

Part I—Design and Construction

By FRANK L. FLOOD
Partner
METCALF & EDDY, ENGRS.
BOSTON, MASS.

IN OUR communities situated on a river such as at Greenfield, the treatment of sewage is usually provided either to protect the local community from objectional conditions or to eliminate or prevent conditions objectionable to the neighbors below on the stream.

The question of sewage treatment and degree of sewage treatment required, while susceptible to the scientific study of the requirements, is usually established by state authorities having jurisdiction over the public health and public waterways and often on the basis of administrative practice. For Connecticut and Massachusetts, along the main stem of the Connecticut River and along its principal branches, the state authorities have required, as a minimum, that reasonably efficient sedimentation and removal of floating materials be provided for municipal sewage. Accordingly, sedimentation plants for treatment of sewage have been provided at Hartford, Middletown, Enfield, and West Hartford in Connecticut and at Springfield, Greenfield, and Amherst in Massachusetts. It is understood that a similar degree of treatment will be approved for East Hartford, Windsor Locks, and Portland in Connecticut and for Agawam, East Longmeadow, Chicopee, Holyoke, Westfield, and Northampton in Massachusetts.

During recent years there has been a growing demand for sewage treatment to restore or preserve the attractiveness of the stream or body of water into which sewage or treated sewage discharges. The demands for recreational uses of stream and shore waters have been of increasing weight and importance.

The Author

Some authorities still think of the need for sewage treatment only in terms of protection of water supplies or avoidance of gross nuisances. Others have recognized the need for restoring to an attractive condition those waters which due to sewage pollution have lost to some degree their attractiveness for recreational purposes.

Treatment Requirements At Greenfield

Greenfield is a town of 17,000 population, a large portion of which is served by the municipal sewerage system. Industrial wastes are not of such character and volume as to appreciably affect sewage disposal problems. The average sewage flow including industrial wastes is about 1.6 mgd., representing approximately 100 gallons per capita per day. Average daily flows during wet months may approach 3 mgd., and during dry weather may be about 1 mgd.

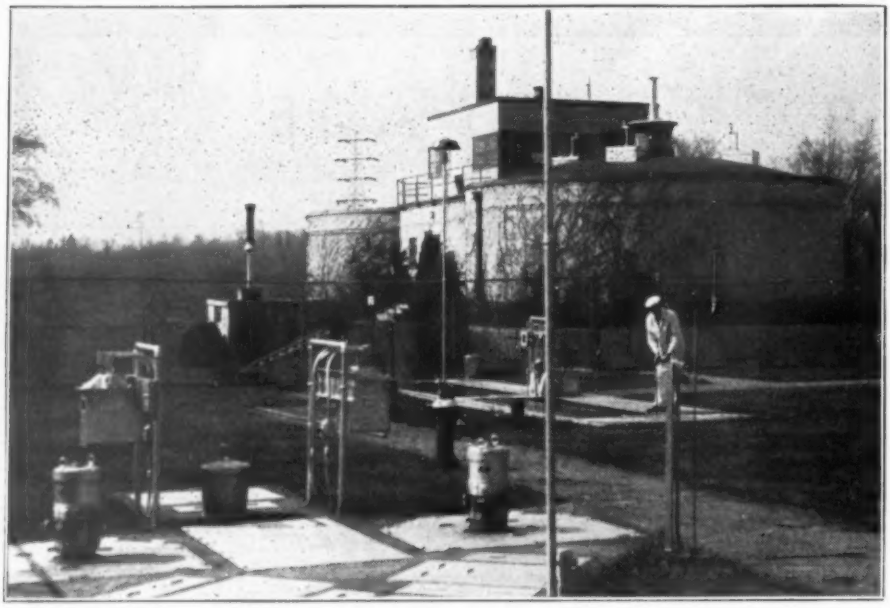
Sewage treatment plant requirements were based upon a tributary population of 20,000, an average flow of 2 mgd., and a maximum rate to be treated of 5 mgd.

Most of the developed portion of the town is within the Green River drainage area just above its point of discharge into the Deerfield River. The Deerfield River discharges to the Connecticut River about 2 miles, by river, below the Green River outlet. The runoff in the Green River was not considered a controlling factor in the requirements for sewage treatment at Greenfield in that the treated sewage could be discharged at moderate cost through an outfall sewer to the Deerfield River, if necessary.

The Deerfield River has a drainage area of approximately 700 sq. mi. The total drainage area of the Connecticut River at Montague City just below Greenfield is 7,865 sq. mi.

Minimum mean monthly flows in these rivers seldom fall below 0.25 cfs. runoff per sq. mi. In 2,556 days of records for years 1928 to 1935, the flow of the Deerfield River at Charlemont where the drainage area is 362 sq. mi., was below 0.25 cfs. per sq. mi. on less than 60 days or about 2 per cent of the time. Corresponding rates of flow would be 175 cfs. for the Deerfield River and 1,966

*This paper and its companion paper, designated Part I and Part II, were presented before the New England Sewage Works Association and are here published by permission of the Federation of Sewage Works Associations.



Greenfield Sewage Plant—View from Northeast

cfs. for the Connecticut River at Greenfield.

Massachusetts' experience has indicated that no seriously offensive conditions will result if a flow of 7 cu. ft. per second of diluting water is available per thousand persons discharging untreated sewage to a stream.

Assuming 7 cfs. of diluting water required during the warm months of the year and periods of mean monthly low rate of runoff, the Deerfield River at Greenfield would provide for the discharge of sewage from a population of about 25,000 and the Connecticut River just below Greenfield would provide for the discharge of sewage from a population of about 280,000. There should be ample dilution available for the disposal of the sewage from Greenfield without serious depletion of oxygen in the stream.

After a study and review of the various factors involved, the conclusion was reached that the sewage of Greenfield should be treated for the efficient removal of floating solids, grease, scum, and settleable solids. This degree of treatment may best be accomplished in sedimentation tanks and is commonly described as primary sewage treatment as distinguished from more complete treatment processes.

Treatment Plant at Greenfield

The basic design data for the Greenfield sewage treatment plant are appended.

The prevention of the dissemination of objectionable odors is frequently one of the serious problems encountered by the engineer in the design of sewage disposal facilities. At Greenfield this problem of odor control was of importance due to the proximity of the plant to a golf course, bus garage, and a residential neighborhood.

In a plant of the type selected for Greenfield, the most troublesome sources of odors are usually open sewage channels and sedimentation compartments. It was therefore deemed necessary to cover all sewage channels and the sedimentation tanks. Sewage may only be observed at the plant by lifting hinged plate covers.

At Greenfield, the sludge digestion tank has a fixed roof and the sludge storage tank is open. When conditions make it necessary, a cover may be provided for the storage tank.

The sludge drying beds are not covered. If the available area is restricted or if local conditions warrant the additional expense, the sludge beds may be covered with glass-overs.

The sewage system at Greenfield is on the separate plan and is not designed to provide for storm water runoff. At the time the plant was built it was not deemed necessary to provide grit chambers of the conventional type for the treatment of domestic sewage at the entrance to sewage treatment plants. Instead, small hoppers were provided to intercept gross materials. Subsequently, experience at this plant has shown that there are substantial quantities of heavy sewage solids which give sufficient trouble in operation of the plant to justify the provision of a grit chamber to intercept those solids ahead of the sedimentation tanks.

If the material recreational use of the Connecticut River below Greenfield should develop, it is probable that the sedimentation process should be supplemented by disinfection of the effluent with chlorine. It is improbable that secondary treatment of the sewage by chemical or biological processes will be necessary for many years.

Basic Design Data and Outline Description

Population, design basis.....20,000

Sewage flow, design basis, mgd. average 2.0

Sewage flow, design basis, mgd. max. to be treated..... 5.0

Regulation of flow—regular chamber with McNulty 18x12-in. shear type sewage regulator for automatic discharge of storm flows in excess of 2½ times the average dry weather rate (5 mgd.) into the Green River. Located 1400 ft. above plant.

Main interceptor—30 in. reinforced concrete pipe—slope 0.4 ft. per 1,000 ft. Capacity 6.5 mgd.

Parshall flume — 30 in. entrance channel width, and 12 in. throat. Provides for measurement of influent. Transmitting instruments and float in stilling well and recorder in main operating gallery are by Builders Iron Foundry. Flume has a capacity of 0.22 to 10.4 mgd.

Grit chamber—9 ft. long by 2 ft. 6 in. wide with bottom consisting of two hopper type pits placed in line of flow. Provided mainly to slow velocity sufficiently to remove heavy grit and heavy objects prior to passage through comminutors.

Comminutors—Two 24-inch Chicago Pump Co. comminutors, each of which is capable of handling maximum flows. Revolving drum 12 in. high has slots ⅜ in. wide. Powered with 1½ hp. motors. Units can be operated both manually or automatically.

Bypass Rack—provided to bypass comminutors and located midway between them. Channel is 3 ft. wide, bars are 2½x⅜ in. spaced 2 ft. on centers. Rack inclined 60° to vertical, hand cleaned, rakings are buried. Provided for emergency use only. Aluminum slide gates provided for regulation of flows to the comminutors and bar rack.

Sedimentation Tank—Two tanks each 16 ft. wide by 72 ft. long with average sewage depth of 10 feet. Provide detention period of two hours at average flow rate of 2 mgd. Tanks have conveyor, scraper type sludge removal mechanisms by Link-Belt operating with speed of 2 ft. per min. Sludge hoppers, four in all, two in each tank, have capacity of 103 cu. ft. each. Sewage flow into and out of tank is over influent and effluent weirs. Scum collected at effluent end of tank and removed through scum box to storage manhole. Scum disposal is by pumping to digestion tank with raw sludge. This and previously described structures are covered for odor control.

Sludge Digestion Tank—35 ft. diameter by 21 ft. sidewall depth, with 5

ft. high inverted conical bottom. Roof is fixed concrete dome, with rise of 3 ft. 6 in. at center. Capacity 20,000 cu. ft. or 1 cu. ft. per capita. Heating is by hot water circulation through heating coils. Tank surface completely insulated. Tank provided with scum sampling well, scum flushing swivel nozzles, and safety access manhole. Gas collected at dome utilized for heating structures and digestion tank. Supplementary means for heating by city gas also provided.

Storage Tank—35 ft. diameter, 22 ft. sidewall height. Capacity 20,000 cu. ft. or 1 cu. ft. per capita. Piping connections provide for admission of sludge from digestion tank, removal of sludge to drying beds, and overflow of supernatant back to sedimentation tanks.

Sludge Pumps—Two Chicago Pump Co. centrifugal screw feed type-variable capacity from 20 to 60 gal. per min. Used for pumping raw sludge from sedimentation tank to digestion tank, digested sludge to storage tank, recirculation of solids or supernatant in digestion tank.

Sampling piping—Sampling pipe connections carried from five levels in digestion tank to pitcher pump in overflow chamber.

Heating plant — Gas fired water heater. Sludge gas, city gas, or combination of both burned. Gas system contains meters, regulating valves, and relief valves on all lines. Waste gas burner is mounted on roof of gas control vault.

Pent house — Contains electric controls, laboratory equipment and provides operator's office.

Sludge drying beds — Twelve beds, each 20x62½ ft. long. Total area, 15,000 sq. ft. Sludge removal and disposal to low lying areas at treatment plant site and for low grade fertilizer.

GREENFIELD'S SEWAGE WORKS

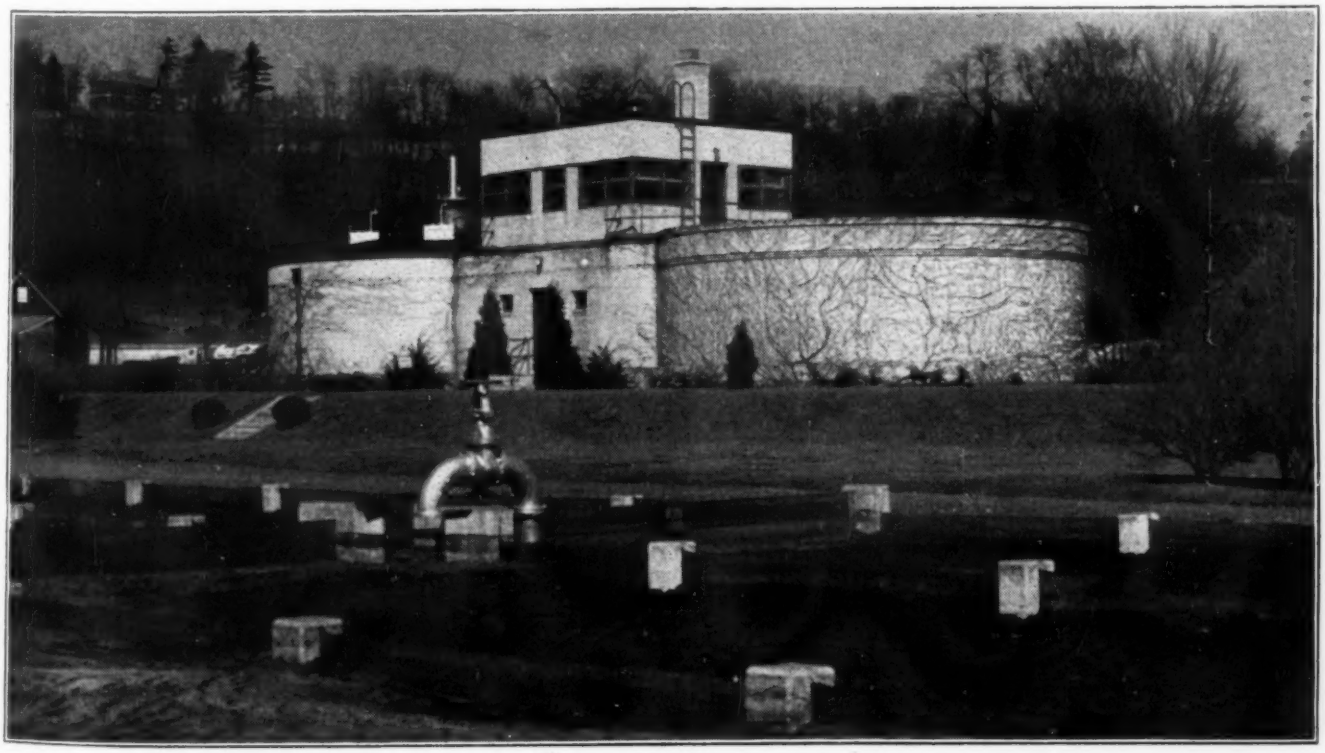
Part II—Operation and Maintenance

By EUGENE L. BOND, Supt.
Streets, Sewer and Engineering Depts.
GREENFIELD, MASS.

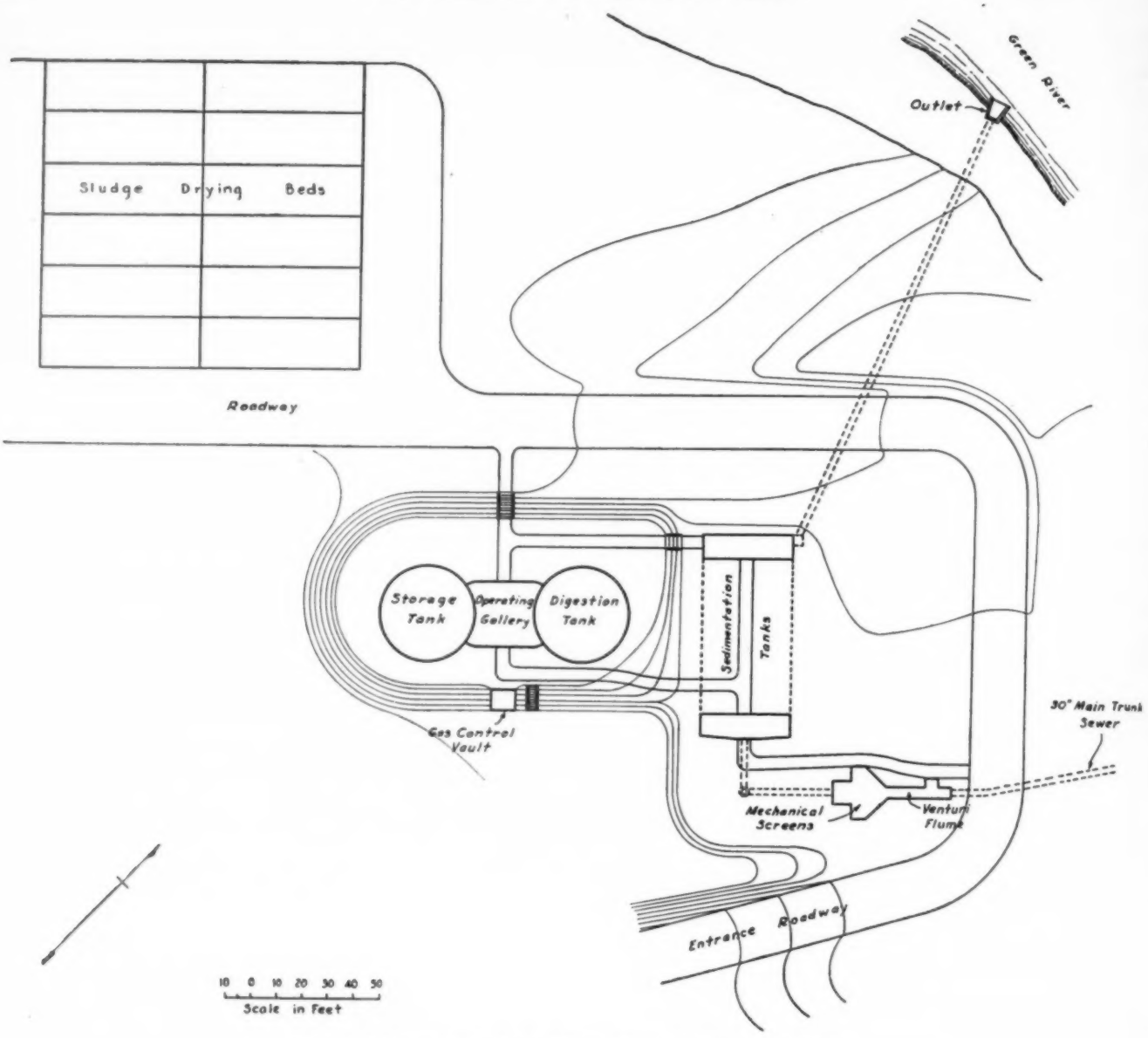
GREENFIELD, the county seat of Franklin County, has a limited form of Town government, a population of 17,000 inhabitants, and an area of 21 square miles. It is bounded on the east by the Connecticut River and Fall River, on the south by the Deerfield River and is bisected by the Green River. Practically all the drainage area of the Town flows into the Green River. The elevation above sea level at Main St. is approximately 240 ft., and at the sewage treatment plant, 135 ft.

The Author

The Community is unusually well located for removing household and industrial wastes and surface water. Surface slopes are adequate for the collection of rain water and allow for proper grades in underground pipe lines. Fortunately, the Town has no chemical or heavy industrial wastes to contend with.



Greenfield Sewage Plant—View from Southwest
Sludge beds in foreground.



General Plan of Greenfield, Mass., Sewage Treatment Plant

History of Town's Sewers

The first sewers or drains in the town were laid in the 1870's. This early construction consisted mostly of covering, with brick or stone, two small brooks passing through the then business and residential part of the village, and emptying into the Green River.

The year 1910 marked the beginning of the present modern system. A 30-in. concrete interceptor was laid from the mouth of the Green River crossing under the same by means of an inverted syphon. This syphon is located a short distance above the present sewage disposal plant. The interceptor follows the east bank of the river and with additions which have been built in the intervening years, covers a distance of 3 miles.

Two large lines and numerous small sewers, which up to that time had been emptying into the Green River, were connected to the interceptor. These branch lines carried both storm and sanitary sewage. Regulators were installed at the junction of the two large sewer lines, one being approximately in the middle, and the second at the end of the construction. The plan was to allow the lines to discharge directly into the river when they were overloaded with storm water.

In the early 1920's trouble began to be experienced with these regulators allowing the discharge of sewage into the river in times of dry weather flow. Upon investigation it was found that the tributary lines which have considerable velocity were bringing an excessive amount of grit and stone and depositing it in the comparatively flat grade of the interceptor. It was decided that there were cheaper ways to obtain road material than digging it out of the interceptor, and that a start should be made toward eventual separation of the storm water from the sanitary sewage. Such a plan would be in line with the needs of a future treatment plant.

The original 30-in. interceptor had a small screen house near its outfall, the idea being to screen out most of the large material before it was discharged into the river. This was only a short distance below the syphon above mentioned. The screens never received proper attention as they were located in an out of the way place. Consequently it tended to back the sewage to the syphon and interfered with its operation.

In 1929 the interceptor was extended northeasterly along a small stream called the Cherry Rum Brook to take care of the rapidly growing northern portion of the town. To eliminate the laying of a long line

which would have been expensive to construct and would have passed through unsettled territory, a small Fairbanks-Morse Automatic Relift Station of underground construction was installed. This station has two 4x4 vertical impeller sewage pumps with ten hp. motors. The cost of operating this plant averages five to six hundred dollars a year. The plant has now been in operation 16 years and has given satisfactory service.

Present Conditions

At the present time we have 41.2 miles of sanitary sewers, and 22 miles of storm water. Our system is nearly separated, although there are a few conditions yet to be corrected. Ninety one per cent of the population is connected to the sewer system and all of this is treated with the exception of a small section lying east of the disposal plant which flows through two small lines directly to the Connecticut River. Plans have been made to take care of this area.

All sewer extensions in streets are assessed against the abutter in the form of a connection charge made when the lateral connection is laid. All trunk lines or interceptors are financed through the general tax levy. The house or building laterals are paid for by the owner and are as a rule laid by the department. The owner is responsible for its upkeep.

Future sewer connections are anticipated on new highway construction by the laying of laterals to the edge of the pavement. Obsolete structures are to be rebuilt. Manholes, if not already in existence, are built at approximately 225 foot intervals. We have found this practice has paid good dividends in stopping the need for cutting into our pavements, either for the laying of new lines, making repairs, or clearing stoppages in the mains. One section of our town by-laws prohibits the connection of rain water leaders into the sanitary sewers.

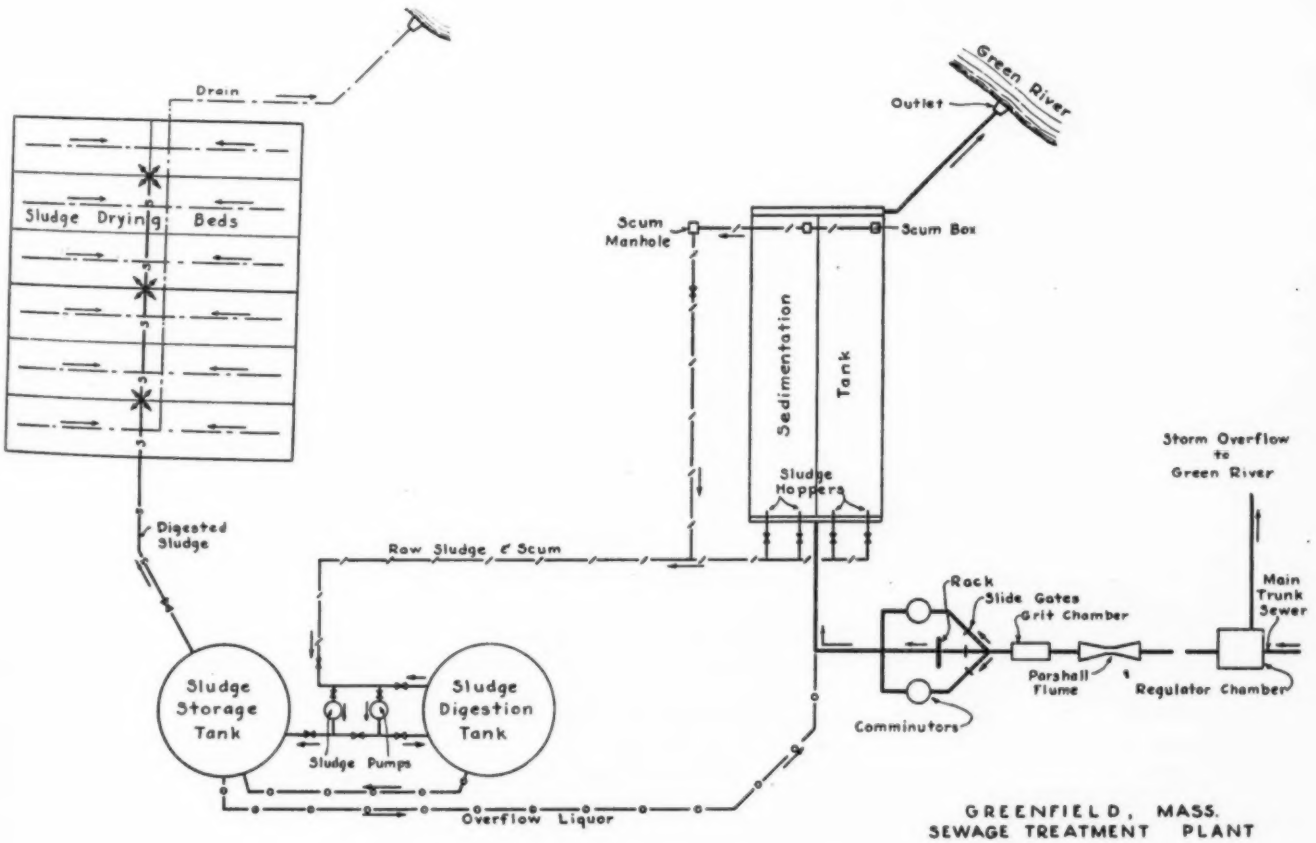
Plans are complete for a sizeable post-war sewer and drainage program. Work will start as soon as conditions warrant. The sewers to be laid under this program will be in areas which at the present have none or inadequate drainage facilities.

During the depression years, a large number of sewer lines were built or relaid. A number of open brooks were enclosed by the building of culverts or laying concrete pipe. Some of the old sanitary lines that were giving poor and inadequate service due to small size and infiltration of ground water, were relaid with larger pipe and care was taken to make the joints as tight as possible. Asphalt jointing compound was used in most cases. We have found that cement joints are not always a success. This work has cleared up many of the trouble spots. We have very few complaints due to flooded basements at the present time.

The troublesome condition which prevailed in the interceptor has been eliminated. We have not had to clean this line in over 20 years.

We experience very little trouble with our sanitary lines becoming filled with sand or grit at the present writing. Our stoppages as a rule are caused by roots. Greenfield has a great number of fine trees which cause us plenty of trouble. The majority of these trees are elms or Norway maples. Up to a few years ago there were numerous poplars in the town. Through the cooperation of the Tree Department these pests have been removed. We have found that some of the soft maples are almost as bad in filling the lines with roots.

Different jointing compounds have been tried with varying degrees of success in the laying of vitrified clay pipe in an effort to keep roots out of the lateral house connections. The conclusion has been reached that the only way to be absolutely sure is to



Diagrammatic Layout Greenfield, Mass. Sewage Treatment Plant

lay cast iron pipe with lead joints. During the shortage of vitrified clay tile, Orangeburg fiber sewer pipe is being successfully used for house laterals.

Operation of Sewer System

The employees of the department, who now number about forty-five, work on both highways and sewers although a few men are more skilled in sewer work. The sewer foreman has charge of the disposal plant with an operator who is at the plant 6 to 8 hours daily for 6 days. The foreman operates the plant on the seventh day. The plant is open from 8 a. m. to 6 p. m. on week days and long enough to pump twice and take necessary readings on Sunday. Extra help is needed at certain seasons for mowing the grass, painting, removing sludge, etc.

The sewer foreman has 2 to 3 men available who can be used for stoppages or laying house connections. We have to clean most of the house laterals as it has got to the point where the plumbers do not like to do this work and most of it is dumped on us. Fortunately we are well equipped for this work. The average stoppage in a house connection can usually be freed in less than an hour, with our flexible sewer rods. This piece of equipment has proven to be one of the most valuable the Town owns. Since our purchase of these rods the cost of freeing stoppages has been cut more than in half. It is much easier and more pleasant for the men as they seldom have to enter a manhole or dig to free a line.

Operation of the Disposal Plant

The plant is designed to withstand abnormal floods which have reached levels as high as the penthouse floor. We have been fortunate in the past 6 years in not experiencing more than ordinary freshets which do not affect the operation of the plant. The plant has been working satisfactorily except for a few minor trouble spots.

The grit chamber has not been found adequate and plans have been drawn by Metcalf & Eddy for the construction of a new chamber which will be located just north of the Parshall flume. We expect this to help in the operation of the plant. Apparently we are getting more grit than expected when the plant was designed. Comminutors have been very successful. Both machines have just been pulled out of the pit for a general overhauling for the first time in six years. This work consisted of replacing combs and shear bars and installing a new base seal.

The bypass racks have not been used since the plant has been in operation. The aluminum slide-gates have proven satisfactory, and I would advise aluminum or some noncorrosive metal covers in place of the steel ones which we have over our sedimentation tanks. The steel covers take a yearly paint job to keep them in good condition. The covered sedimentation tanks materially reduces the odor around the plant. We have found that cleanliness about the plant is a great help in keeping down odors. No trouble has been experienced with the Link-Belt equipment. In winter it is necessary to watch the oil switches which are in the open and exposed to the weather, and remove the accumulation of condensed moisture from them.

As yet we have not had to contend with any scum condition in the digestion tank. The Chicago Pump Co. scru-peller pumps have given good service though we have had pieces of metal come through in the raw sludge, catching in the worm and jamming the pump, necessitating the removal and repair of same. Considerable wear on the screw and impeller has been caused by the grit which we hope to eliminate on the construction of the grit chamber. The pumps require about one overhaul each year.

The heating and gas control system has required only occasional cleaning and adjustment. The waste gas burner has a tendency to blow out. More than sufficient sludge gas is generated to heat the digestion tank and the operating gallery. No fuel other than sludge gas has been used since production started in 1940.

An effort has been made to keep the temperature in the digester at about 85 degrees. This rises some in the summer and may drop 3 or 4 degrees in the winter. The temperature of the raw sewage varies from 45 degrees in winter to 65 in the summer. The total gas production for 1945 was 3,772,660 cu. ft. Total amount used for heating was 2,089,780 cu. ft. More gas is produced during the warm weather than in the winter. At certain times there is just enough to take care of the needs, which is about 7,000 cu. ft. per day. Although the pH of raw sewage averages throughout the year 6.1, the average pH for the digestion tank is 6.8. We have no trouble maintaining this. Very little lime is used.

We have found the drying beds adequate for the digested sludge. We draw off from the storage tank to the beds twice a year, spring and fall. There has been no great demand for sludge for agricultural purposes. It is used by Town departments for top dressing on lawns and flower beds. Our experience has shown that it makes an excellent top dressing for lawns.

The volume of sewage treated in 1945 was 527,000,000 gal. and the city water consumption in the same period was 637,116,670 gal.

The cost of operating the plant for 1945 was $3,313.43, broken down as follows: Power, $320.86; Labor $2,982.10; Supplies and Repairs, $100.47. Our sewer appropriation for 1945 was $6,500. This appropriation covers the cost of operating the sewer plant, sewer relift stations, maintenance and minor construction. Operation of equipment such as trucks on sewer work, comes from another appropriation. Due to increased costs, our sewer appropriation has been increased this year to $8,000.00, with $5,000.00 extra for extensions due to renewed building activities.

Our total appropriations for highways and sewers this year (1946) is $108,888. Similar appropriations ran from $200,000 to $300,000 at times previous to the war.

H. T. Rudgal New Water Sup't. at Kenosha

According to an announcement of Robert M. Smith, Director of Public Works of the city of Kenosha, Wisconsin, H. T. Rudgal has been appointed Superintendent of the Water Department effective April 1, 1947. Mr. Rudgal succeeds James W. Myers, Jr., who has taken a position with the Philadelphia Suburban Water Company.

Frank I. Vilen, formerly Assistant City Engineer, has been promoted to the position of Superintendent of the Sewage Treatment Plant, and Elroy F. Spitzer, graduate of the University of Wisconsin and a recently discharged officer in the Civil Engineer Corps of the U. S. Navy, has been appointed Assistant City Engineer.

INDUSTRIAL USAGE OF STREAMS

The Question of Fullest Use Without Abuse

By L. L. HEDGEPETH
Executive Secretary
VIRGINIA WATER CONTROL BOARD
RICHMOND, VA.

THE continued movement of industry southward and the increased sewered population are adding to the waste load of southern streams. This situation has created a demand for effective control of pollution. Some pollution loads can be tolerated by a stream without impairing its health, but other pollution loads will upset its digestion. Failure to appreciate this important distinction results in the misunderstanding which is an underlying cause of indifference and a source of much undesirable prohibitory regulation.

During 1946, Virginia enacted a water control law to provide for the control, prevention and abatement of pollution in the waters of the state. Since Dec. 1, 1946, the author has undertaken to administer this law for the State Water Control Board.

Having worked for industry since 1929, the author realizes that the cooperation of industry must be obtained if the program is to be successful. It should be sold to industry's engineers on the merits of each case. Although the objectives of the pollution abatement program are the same from all angles of examination, the approach to its solution is influenced by the employment environment of the individual.

Fears of Industry

An industrial friend recently expressed the opinion that the waste water discharge restrictions now being adopted would substantially arrest the movement of industry southward.

In effect he said: "If the new Virginia law prohibits all new pollution, how is new industry to be established? Further, existing industries have an exceedingly difficult period ahead if the law requires them to clean up their wastes. These plants must have plenty of water and a place to put it after it is spent in process. Many industrial waste disposal problems are unsettled."

Except for one important defect, this logic is unassailable. If it is clearly understood during design that, although stream abuse will not be permitted, reasonable use will be encouraged, it is believed that industrial technology is sufficiently resourceful to find an economically acceptable answer. If there is no answer for disposal of wastes from a specific plant and stream pollution is going to be an inescapable price of another industrial payroll for the community, then the problem becomes greatly simplified. It may and should be presented to the community on the watershed as a whole: "Are you willing to have this river become an offensive water course as a part of the price of industrial development of this basin?"

The industrial engineer would welcome such a frank approach *before*, rather than have to face it *after*, the plant is built. He is no different in his method of reasoning from any person who makes his living by technical applications. He prefers to arrange his problem in an orderly manner and then to devise a logical solution. Government owes these men a rational delineation of stream pollution abatement requirements, to be considered as a part of the problem of plant location, before the plant is built and operating.

The Author

At the time this paper was presented before the joint meeting of the North Carolina Section of the Am. Water Works Ass'n and the N. C. Sewage Works Ass'n, Mr. Hedgepeth was in the course of transition from his former position as Director, Technical Service Dept., Pennsylvania Salt Mfg. Co., and his present position, as Executive Secretary and Technical Director of the Va. Water Control Board. The opinions and statements of the author as set forth in this paper, do not necessarily represent the opinions of the members, nor signify the future policies of the recently created Water Control Board of Virginia.

This statement is made at the request of Mr. Hedgepeth, whose interesting paper presenting a dual viewpoint on pollution abatement procedures is here printed by authorization of the Sewage Works Federation and the Amer. Water Works Association.

Industrial Responsibility

A corollary to this fear that stream pollution control will drive away industrial payrolls is the pronounced impression that industry is callous in acceptance of its share of the responsibility. Dr. Abel Wolman strongly indicted municipalities and industry in his paper on "Responsibility for Industrial and Municipal Wastes."[1] Dr. Wolman was particularly severe on industry. Viewing the problem in perspective for the entire country, he fixed the pollution load as the discharge of raw sewage from 47,000,000 people and industrial wastes equivalent to an additional population of 55,000,000 to 60,000,000. He classed industry's conception of its *rights* to pollute streams as a "sacred cow," adding that the general characteristic of industrial stream pollution abatement was, at its best, carelessness; and, at its worst, a complete disregard of industrial responsibility.

Professor Wolman's summation was characteristically apt and should be required reading for management, but the author believes that his indictment of industry is faulty in spots. Particularly objectionable were the allegations of little research on waste disposal, of no studies beyond the sewer outlet, and of a disregard of responsibility.

Industry is doing much research in stream pollution abatement, but it appears in the record principally as process improvements—process changes to eliminate waste. That, incidentally, is a common sense objective, as well as a profitable point, in any attack on stream pollution. Regardless of how they are described, any adjustments which reduce the pollutional load must be properly classified as abatement measures.

The author knows a number of industrial plants where stream pollution abatement studies are very comprehensive. Others have stream pollution committees at work, composed of representatives from various divisions of the company. These actions

are taken in self-defense in order to promote good relations. It is good business to keep one's house in order and to be on good terms with one's neighbors. There is an interesting untold story in this for industry's public relations men.

Finally, the charge of failure to accept responsibility needs clarification. Industry should not be asked to be altruistic. It is silly and wishful thinking to expect it. A corporation is merely a paper creature; it has no conscience; it has no soul. Of necessity it is operated on hard-headed business principles with the objective of making a profit.

Business may exist only by being at least self-supporting. It has no power to levy taxes for its deficits. Its costs must be kept below its income. If the public wants its streams to be clean, then appropriate legislation, enforced impartially, will be required to be fair to all industrial plants, placing them on an equal basis with competitors. It is not helpful to the pollution abatement movement to indict industry in the absence of such requirements.

Towards a Solution

Much is made of industry's inability to solve all of its waste disposal problems. It is a fact that no generally applicable solution has been found for many wastes. For example, the sulfite pulp waste liquor problem remains unsolved as a whole, even though several satisfactory individual solutions have been devised. But one does not make progress by becoming appalled over limitations.

The author does not believe that continued abuse of streams should be accepted merely because many phases of industrial waste reclamation or treatment are yet unsolved. It has been his good fortune to have a wide acquaintance among the technical men of industry. Most of them would welcome the requirement to complete their work on manufacturing processes so as to eliminate the wastes substantially, or arrange for their disposal. They are only human and, being so, have selfish pride in their work. No good man likes to turn out a half-finished job. Well-considered law and regulations should do much to encourage a greater completion of manufacturing processes, thus eliminating a major quantity of wastes which otherwise would reach the streams.

Poor Control Measures

Conceding that a sound legal structure for co-operative approach is strongly indicated, industry can, without regrets, dispense with those strength sappers—namely, prohibitory regulation and/or paternalism. Prohibitions result in fines and irritation, and governmental paternalism is wasteful beyond all defense.

Furthermore, if work needs to be done on waste disposal, it can be accomplished best at the local level by the men in each plant, not by walking delegates of government.

Attacking at the Source

Industrial waste disposal reaches its most effective development through the combined efforts of the chemical engineer on the manufacturing processes and the sanitary engineer on the effluent. As has been observed earlier, the most profitable place to start correction is in the manufacturing process. It is difficult to wax enthusiastic in the matter of constructing imposing waste disposal plants on the tail ends of industrial sewers. Industry does not think that way. Its problem is quite different from municipal sewage in one important respect, and that is the lack of assurance that any particular waste will be a problem for the length of time required to justify a major investment in a waste treatment plant. Human beings may be expected to continue to eat and eliminate body wastes without much change for a long time. Industry, on the other hand, is continually changing its operations. With these changes required waste treatment may well change.

When the plant man has done all that is economical on waste reduction through changes in the manufacturing process, the sanitary engineer must then devise a suitable treatment or other disposal of the waste so as to avoid stream abuse. The industrial engineer will endeavor to reduce his problem to its simplest form, and then arrange for functional waste disposal units on an economically sound basis, rather than impressiveness of structures.

Specific Examples

The correctness of the above reasoning may be illustrated by considering the relatively simple waste disposal problems presented by the manufacture of two synthetic insecticides—DDT and the important but as yet lesser known hexachlorocyclohexane, also called benzene hexachloride, gammexane, or simply 666.

DDT is formed in very strong sulfuric acid which merely serves as the medium for the condensation of the DDT isomers without entering into the reaction. After much use, the strong acid becomes fouled with process refuse and must be withdrawn and replaced with a clean charge. Also, the DDT crystals removed from this syrupy acid must be washed free of acid before being further processed for use.

Thus are produced, for each ton of DDT made, about 700 lb. of foul 93 per cent sulfuric acid and 7,000 lb. of relatively clean 7 per cent acid wash water. The disposal of this acid is the significant phase of the stream pollution problem presented by the manufacture of DDT.

Neutralizing 93 per cent sulfuric acid is no easy task, and diluting it merely complicates the problem by increasing the volume of final effluent. Further, even if it were diluted and neutralized, its organic content precludes its discharge into a healthy stream. Obviously a use should be found for this strong waste, or it should be burned to destroy the organics and to recover its acid values. Therefore, returning to the original thesis of "not upsetting our technical digestion by gulping down the stream pollution problem as a whole, but of attacking it forkful by forkful," the disposal of this strong fraction should be considered as a manufacturing problem, rather than as a treatment problem, because its discharge to waste is an economic loss.

However, if there are no restrictions on waste discharge into streams, a cost-conscious management may prefer that the time of its engineers be utilized for more pressing problems than waste recovery or disposal. Whether we like it or not, the answer to the classic question: "When will a rich man spend a dollar?" often still seems to be: "When he can make two." And the author personally has no hope for any radical change in that attitude, regardless of the type of industry, its geographical location or the political philosophy of the business man.

The 7,000 lb. of relatively clean 7 per cent sulfuric acid wash water produced per ton of DDT is clearly a stream pollution problem—law or no law—because of economics.

The wastes from hexachlorocyclohexane present an entirely different problem. Available information has it that three tons of presently unusable chlorinated organics are produced for each ton of usable product. Obviously, such a waste of material classifies this process as incomplete. Research simply has not finished its job. Uses should be found for these rejects in order that they may be sold or used as co-products or by-products. If this is not done, the consumer will continue to pay more for the materials marketed, because

of manufacturing losses by way of the sewer. And this will prevail just as long as use of the stream is the cheapest known method of disposal, or as long as there is no stream control law to encourage a different attitude toward waste and pollution.

Sensible Control

Regulation of waste disposal should be accomplished by control measures which are practical. This approach will yield constructive solutions. The average engineer in industry is willing to co-operate and may be expected to find an acceptable answer to waste disposal, if he can present the problem to his management on a "must" basis, and if he is permitted a reasonable use of the assimilation capacities of the stream. Without his co-operation, little progress on waste abatement will be accomplished.

The action most disliked by industry, and to which resistance all along the line may be expected, is the *prohibitory* type of regulation. It serves no basic purpose to have the sheriff wave legal papers at a plant superintendent and drag company officials into court for a fine. Of course, publicity of a sort is obtained. The man on the street will say "The state's finally getting tough with those fellows — we can start catching fish again before long." But such action merely deludes the public and should be beneath the dignity of the stream pollution authority. History clearly shows that prohibitory type of control does not correct stream abuse. Fines paid into courts do not neutralize one pound of acid or satisfy one part per million of B.O.D. Process change and waste disposal construction are the only steps which will reduce the industrial waste load. At one plant in Virginia, the person responsible for solving the waste problem told the author that it would be more economical for his employers to pay a fine of $100 a day for the life of the plant than to make the required sewer separation and build and operate the treatment plant they are now constructing.

What Constitutes Pollution?

The case for the co-operative approach requires decision on when waste discharge is or is not abuse of the stream. Definition is not easy; it is like trying to define "poison." The only really good definition of poison which the author ever heard comes from Warren Watson, who has been wrestling with it for many years. He says[2] that a poison is "too much"—too much of anything. A half pound of table salt taken in one dose may destroy a human life; it is reported to be a form of suicide in China. No one would think of classifying salt as a poison, yet the half pound, at one dose is definitely "too much".

A similar definition is suggested as the nearest approach stream sanitarians should make to a definition of pollution. Pollution to the extent of being "too much" constitutes stream abuse—too much load for the stream to assimilate and remain healthy. And it covers everything discharged into a stream. Not just too much B.O.D., sludge, grease, acid or alkali, but too much of *anything*—even table salt.

Pollution could also be caused by too much chlorine, that servant of public health men, who consider it a useful treatment for sewage and waste effluents, and use it freely. Sanitary engineers do not normally think of chlorine as a pollutional substance, but it must be classed as such, if "too much" is discharged into game fish streams.

Similarly ammonia, commonly considered by sanitarians as a relatively harmless substance in effluents, must be regarded with suspicion in a fishing stream, for it is highly toxic to some game fish.

According to the author's limited viewpoint, the best determination of what constitutes pollution is accomplished by pooling thoughts in each individual case and settling details at the local levels. This method may not always provide a *perfect* answer, but it only gets the load reasonably reduced and means that progress is made. In the matter of setting standards of purity for each stream, engineers, accustomed to the use of yardsticks in their work, usually prefer to have standards established for each individual stream. But, when deciding on how to "bell the cat" in this field of technical work, standards may not mean a great deal. Local conditions must take precedence over standards, although standards may be eminently correct for general or broad application.

Some Waste Disposal Regulation Objectives

What can be set as a goal? General objectives would be to remove the sludge, scum and grease, destroy or divert objectionable concentrations of toxic agents, reduce discoloration to imperceptibility in the stream, adjust acidity or alkalinity of the effluent to the normal stream range, and reduce the flowing B.O.D. load to the point where it can be assimilated by the stream without dropping the dissolved oxygen below acceptable minimums. Even these generalizations are too inflexible for some specific applications.

The author has endeavored to present this problem as requiring firm co-operative regulation based on sound law. Legislative action is needed to provide a skeleton of strong girders on which appropriate regulation can be constructed *to stay*, and this time weathering the storms which will certainly come when industrial competition once again becomes keener, and profits less profuse. Once a strong enforcement structure is provided, the corrective actions must become largely technical, not legal. Sanitary and chemical engineering of the most exacting type will be needed. Stream pollution law and enforcement regulations cannot exceed the proved art and science of waste disposal. Unless this fact is thoroughly recognized, the law will be set aside by the courts, repealed by the legislature, or become unenforced simply because, through lack of know-how, it cannot be enforced. As to the latter situation, stream authorities have already had ample experience.

If the problem is approached on the premise that the true measure of the wealth of a community is the production of goods, and that the public need requires both that our plants operate and that stream degradation cease, industry's engineers will co-operate to find a workable answer.

Men who comprise industry resent the idea that they must be fought on matters of public need. They like to think of themselves as being good citizens and good neighbors—and must do so, or they would lose their self-respect. They are a part of the public that must make use of stream waters in their plants and processes and they must drink the water from some of these streams. They like to fish and swim in them, and when they do, they don't like to wade through sludge or see waste and sewage particles float by. They can be sold on Phelps' beautiful concept,[3] which considers a stream as being a living complex thing of loveliness, of health, of enjoyment—a valuable resource capable of serving man in a multitude of ways and too often rendered unfit through pollution and defilement for any but the most menial of services.

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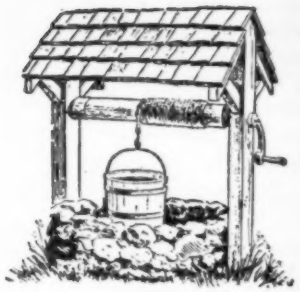
2. Watson, Warren. Private communication.

3. Phelps, Earle B. Stream Sanitation. John Wiley & Sons, New York (1944), p. 1.

FED. OF SEWAGE WORKS ASSNS. CONVENTION PROGRAM



"Meet me at the Well"

20th Annual Meeting – San Francisco – July 21-25, 1947

ACCORDING to W. H. Wisely, Exec. Secy. of F. S. W. A., the following is an outline of the technical program of the Twentieth Annual Meeting of the Federation of Sewage Works Associations, which is to be held concurrently with the 1947 Annual Conference of the American Water Works Association at the Civic Auditorium at San Francisco, California.

The program as given here is essentially complete, with all of the assignments listed having been confirmed. A few discussions of certain papers may be added and some minor rearrangement may be necessary, however, prior to the meeting.

TUESDAY, JULY 22

[Morning]

9:30—Twentieth Annual Meeting Called to Order
F. S. Friel
Business Meeting—Report of Executive Secretary-Editor

10:15—Developments in Sewage Disposal for San Francisco
Clyde C. Kennedy
Discussion: Ralph G. Wadsworth

11:00—The Portland Sewerage Project
H. Loren Thompson and J. C. Stevens
Discussion: A. M. Rawn

[Afternoon]

JOINT SESSION—AWWA AND FSWA
GROUND WATER POLLUTION PROBLEMS

2:00—Basic Concepts in Ground Water Law
A. P. Black

2:45—Ground Water Production Works
Malcolm Pirnie and R. Sawyer

3:20—Formulating Legislation to Protect Ground Water from Pollution
B. E. Doll and A. G. Pickett

4:00—Developing Standards for Protection of Ground Water from Pollution
R. F. Goudey

WEDNESDAY, JULY 23

[Morning]

9:30—Natural Purification Characteristics of a Shallow Turbulent Stream
F. W. Kittrell
Discussion: George E. Symons

10:15—Effects of Sewage and Waste Disposal Practices on Industrial Operating Costs
William J. O'Connell, Jr.

11:00—Treatment and Disposal of Cannery Wastes
L. F. Warrick

11:45—Report on Findings of Industrial Wastes Committee of California Sewage Works Association
W. T. Knowlton, Chairman

[Afternoon]

JOINT MEETING—FSWA AND AWWA
SYMPOSIUM—RECLAMATION OF SEWAGE EFFLUENTS

2:00—Industrial Uses for Reclaimed Sewage Effluents
N. T. Veatch
Discussion: Earnest Boyce

2:45—Use of Reclaimed Sewage Effluents at Baltimore
Abel Wolman
Discussion: Ray F. Goudey

3:30—Agricultural Uses of Reclaimed Sewage Effluents
L. V. Wilcox
Discussion: Dario Travaini

4:15—Limits of Pollution of Water for Industrial Use
S. T. Powell

THURSDAY, JULY 24

[Morning]

9:00—OPERATORS' FORUM—CALIFORNIA SEWAGE WORKS ASSOCIATION

1. Effect of Industrial Wastes Upon Sewage Works Operation
2. Typical Maintenance Problems in Small Cities
3. Gadgets

[Afternoon]

1:30—SYMPOSIUM ON BIOCHEMICAL OXYGEN DEMAND

1. Effect of Temperature on Rate and Ultimate Biochemical Oxygen Demand
   Harold B. Gotaas
2. Monometric Measurement of B.O.D. of Domestic and Industrial Sewages
   W. F. Langelier and David H. Caldwell
3. Biochemical Oxygen Demand of Sulfite Waste Liquor
   R. G. Tyler

ENTERTAINMENT

Monday Night, July 21.—Informal Reception by Officers of the Federation and the Am. Water Works Assn. and their wives in the ballroom of the St. Francis Hotel. Dancing will follow the reception.

Tuesday Night, July 22.—"GALA NITE" in the Civic Auditorium is a joint event for all registrants of F.S.W.A. and A.W.W.A. Music on the world's greatest pipe organ and a famous orchestra composed of talented San Franciscans. In addition the stage show under direction of the maestro "Bill" Orchard as M. C., with California's John Gill as associate M. C.

Wednesday Night, July 23.—At the St. Francis Hotel, the Annual Dinner of the Federation followed by dancing. A.W.W.A. registrants are invited to join the group for dancing. (Dress optional.)

Thursday Night, July 24.—At the Fairmont Hotel, the Annual Dinner of A.W.W.A. followed by dancing. Federation registrants are invited to join the group for dancing. (Dress optional.)

Especially for the Ladies.

Space does not permit detailing of the special Ladies' Entertainment but it seems definite from the schedule that the ladies will find shopping in Chinatown's Bazaars, touring the city and parks by bus and the city's unique cable-cars, the Tea and Fashion Show, and the post-convention tours of California by bus, all extremely novel and interesting.

MONTREAL CONVENTION OF CANADIAN SECTION DRAWS LARGE ATTENDANCE

JUST twenty-seven years ago in 1920 the Canadian Section of A.W.W.A. held its first meeting in Montreal with the official registration reaching the unimpressive figure of 32. What has happened to the Canadian Section in the interim is in evidence during the three-day Twenty-Seventh Annual meeting staged April 14-16 in the city of its birth. The official registration for the Montreal Convention (no mere meeting) was an impressive 730, and representing an attendance gain of 100 more than the 1946 convention. A record attendance of 500 for the opening luncheon and 615 for the closing banquet was noted and gave to the meeting the tone of a real convention. The size of meetings is posing a problem for the Section's Executive in the matter of finding hotels outside of Toronto and Montreal which can handle the Canadian Section's meetings.

Chairmen

(Retiring)
H. S. Nicklin
City Engineer
Guelph, Ont.

(Incoming)
F. J. Veale
Supt. of Water
Hamilton, Ont.

One of the highlights of the Montreal meeting was the "table-cloth and napkin" luncheon served to 400 in the filter operating floor of the Montreal Filtration Plant, as guests of the city's Dept. of Public Works. Another highlight was the "Club Room" which originated with the Canadian Section, and which has been so successfully operated for the past several years by the Canadian Water & Sewage Works Equipment Assn. in the interest of members and guests of the section. Still another highlight was the program of entertainment arranged for the approximately 150 ladies by Madame Des Baillets, as chairman of the Ladies' Entertainment Committee and wife of the principal host, C. J. Des Baillets, Chief Engr. of Montreal's Dept. of Public Works.

Novel Feature

Perhaps the most novel feature of the meeting was the French-Canadian Session, at which all papers and discussions were presented in French.

Membership Growth Noted

Membership in the Canadian Session has now passed the 400 mark, as reported by Secretary Berry who emphasized the gradual but consistent growth in membership over the past several years.

Photo by Courtesy Eng. & Cont. of Canada

The President & Awardee

President Wendell La Due (left) making the presentation of the Fuller Memorial Award to M. H. McCrady for conspicuous services.

Awards and Honors

The George W. Fuller Award went to M. H. McCrady, Chief of Laboratories, Quebec Ministry of Health, in recognition of his contributions to laboratory work in general and especially for his contributions to the development of the manual of Standard Methods of Water Analysis.

Secretary
A. E. Berry
Chief Engr.
Ont. Dept. Health
Toronto

Nat'l. Director
A. B. Manson
Manager
Utilities Comm.
Stratford, Ont.

The Canadian Section's Hunt Award made annually to a deserving water works operator went to Jean Blanchard, Supt. of Water at St. Hyacinthe, Quebec.

Membership Service Awards went to two 30-year members, Prof. R. W. Angus, Toronto (an honorary member of A.W.W.A.) and W. E. MacDonald, Supt. of the Ottawa Water Department. The twenty-five year member award went to R. E. Thompson of Toronto, and for twenty and fifteen year memberships others were cited.

Memorial Awards were made to the widows of C. C. Folger of Kingston, Ont. and G. C. Routledge of Toronto, deceased members.

The customary Past-Chairman's Certificate was presented to the immediate Past-Chairman, Wm. H. Waddell of Owens Sound, Ont. while retiring chairman, H. S. Nicklin, received the Chairman's Memento.

Officers Elected

The following officers were declared elected by letter-ballot just prior to the meeting:

Chairman—F. J. Veale, Supt., Water Department, Hamilton, Ont.

Shots of the Sumptuous Luncheon Given by the City of Montreal in the Filtration Plant

Trustees—R. Harrison, Mgr., Public Utilities Comm., Scarborough, Ont.

M. W. Rogers, Mgr., Public Utilities Comm., Carleton Place, Ont.

The following are carry-over members of the Board of Trustees: N. MacNicol, Comm. of Works, Forest Hill, Ont.; G. H. Baker, Supt. of Water, North York Township, Ont.; W. H. Powell, Chief Engr., Greater Vancouver Water Distr., Vancouver, B. C.; H. S. Nicklin, City Engr., Guelph, Ont.; W. T. Randall, Genl. Mgr., Neptune Meters, Ltd., Long Branch, Ont.

The A.W.W.A. Director until 1949 is A. B. Monson, Genl. Mgr., Utilities Comm., Stratford, Ont., and A. E. Berry continues as the dynamo Secretary-Treasurer.

Canadian Section to Study Rates

The Canadian Section voted to establish a committee on water rates, with the idea of making a study of the several methods of developing water rates and to make recommendations of the soundest of these methods, with the idea of bringing into the Canadian Water Utilities some degree of standardization or uniformity of method of developing water rates, and some basic criteria and factors which should govern in setting up rate schedules.

R. N. Martindale
Supt. & Mgr.
Water Dept.
Sudbury, Ont.

M. W. Rogers
Manager
Utilities Comm.
Carlton Place, Ont.

N. MacNicol
Commissioner
Public Works
Forest Hill, Ont.

Members of the Executive

President La Due Principal Luncheon Speaker

Following a brief address by Montreal's personable and witty mayor, Camillien Houde, who explained the government of Montreal with its elected council of 99 members. The principal address was made by President Wendell R. La Due of Akron, Ohio, to the largest opening luncheon (525 attendance) in the history of the Section.

President La Due's subject was "This Job of Ours," which was introduced with a salutation which he gave in French, much to the surprise of the audience. And the mayor said that it wasn't "half bad" either. We might add that this fellow La Due practices what he preaches when it comes to public relations—this Montreal gesture representing one bit of evidence that he does. Similar evidence was his speech in Spanish at the meeting of the Cuban Section.

Mr. La Due in discussing what concerns water works men most at this time, had the following to say, among other things. Concerning the present movement toward securing stream pollution laws, water works men are eminently practical minded while always hopeful of securing workable legislation and real correction of the present abuse of streams. Standards for water quality have recently gone to a new stringency which the water works profession has endorsed through the voluntary acceptance of the new U. S. Public Health Service Standards of Water Quality by the Am. Water Works Assn. Such action was considered by President La Due as a significant milestone in water supply practice.

Mr. La Due, saying that this matter of "security" of the individual is being over-stressed, decried the present attitude of employees toward their jobs, their interest in "security" being transcendent to an interest in their work and efficient performance which advances individuals and increases production and quality of services or workmanship. It was his thought that too much security guaranteed individuals was certain to set the nation back when considering its previous attainments in efficiency and production. In other words emphasis on insured security is an invitation to a general "slow down" and stagnation of initiative, originality and general productivity of the average worker.

In financing water utilities water works executives must not lack courage to raise water rates if necessary. He cited the recent 25% increase in rates announced by the St. Paul, Minn., Water Department, and others which have increased rates to a somewhat lesser degree, or are about to do so.

"Public Relations," a topic of first importance in President La Due's mind, is now A.W.W.A.'s latest and most important job. Representing nothing more than a job of selling the water utility to the public. The development of confidence in the local water utility management is the one common denominator. Without securing such confidence little else can be done. He then outlined A.W.W.A.'s present efforts, at considerable expense, directed toward showing how water works managers can best secure such confidence and good-will of the public.

TECHNICAL SESSIONS

Under chairmanship of W. S. Lea, consulting Engr. of Montreal the first technical session was devoted to "Water Distribution Systems".

"Advantages in Flow Metering and Controlling" were recounted by C. G. Richardson, Vice Pres., Builders-Providence, Inc., of Providence, R. I. Mr. Richardson described the "Propelloflo" turbine-type water meter, the operation of telemetering units which transmit rate of flow, loss of head, water elevations, rate of filter wash and sand expansion from distant points to a central control station and therefrom to indicators located at various points readily visible to plant operators. He also described the air operated indicating and recording units placed at any convenient location regardless of distance from the meter proper. These units require about 1/10th of a cu. ft. of air per minute, combining economy with practicability of the method of transmitting differentials to indicating, recording and control devices. Such a system is being installed for 20 filter units at the new Chicago Filter Plant for transmitting loss of head, rate of filtration, wash rates and sand bed expansion, with indicators being located also in the Chemical Control Building. These pneumatic control elements are also provided to control the operation of chemical feed machines of the weigh-control type, with guarantees of at least 99.5% accuracy.

Mr. Richardson said that the Montreal and Toronto Filter Plants are equipped with telemetering units for transmitting rate of filtration and loss of head. Providence, R. I., is

Guided Discussion Chairmen

Wm. S. Lea
Cons. Engr.
Montreal

O. H. Scott
Manager
Utilities Comm.
Belleville, Ont.

W. E. MacDonald
Chief Engr.
Water Dept.
Ottawa

N. J. Howard
Director
Water Purif.
Toronto

thought to have the most elaborate central control station of any filter plant, even to automatic timing of the filter wash. Ft. Wayne, Ind., and Cranston, R. I., were cited as sewage plants with "Chronoflo" control systems for sludge conditioning, sewage, sludge and compressed air metering.

In reply to questions Mr. Richardson said that tubing for transmitting air pressures from the differential creating element (tube, orifice, etc.) consisted of ¼ in. copper tubing and that these transmission tubes might be as much as 3,000 ft. in length if the joints are air-tight.

"Cleaning, Lining and Restoration of Old Water Mains", by F. Y. Dorrance, Division Engr., Dept. of Public Works, Montreal.

Mr. Dorrance in a thorough manner detailed Montreal's experiences in the restoration of steel water mains by cleaning and lining in place with cement mortar. We do not expect to do more than highlight this excellent illustrated paper which should be studied by anyone contemplating the restoration of tuberculated or leaking water mains in place. The Montreal steel mains were 40 years old and 37,000 feet were restored. The pipe had suffered from both interior tuberculation and pitting from soil attack due to galvanic or electrolytic attack for the most part rather than electrolysis due to strong electric currents. Based on the successful experience of Akron, Ohio, in restoration of steel supply mains by cement lining in place by the centrifugal method of applying the cement mortar lining, In 1944 Montreal started the restoration project and since has completed 37,000 ft. of mains. The lining is ⅜ inch minimum thickness increasing to ½ inch where pitting was most serious. Mr. Dorrance likens the job to that of casting a ⅜ to ½ inch cement tube within a confining tube of steel which although seriously pitted through in sections still has the requisite confining strength to prevent possible rupture of the thin walled cement tube. The cleaning was accomplished with National Water Main Cleaning Co. water propelled machines, and the finishing was done by hand labor and steel brushes. The lining was done by the Centraline Co. process and equipment for centrifugally applying and trowelling to smooth finish the cement mortar of half sand and half cement and a minimum of water.

Hosts

His Worship
Camillien Houde
Mayor of
Montreal

C. J. Des Baillets
Chief Engineer
Dept. of Works
Montreal

Mr. Dorrance reported that some of the main so lined was actually 5 to 7 inches out of round. The 36,000 ft. of main had been restored at a cost of $200,000, approximately, representing an expenditure of about 1/10th of that for a new 36 in. main. The cost of $5.50 per lineal foot was made up of $4.50 for cleaning and lining alone plus $1.00 for incidental work, including that supplied by the city.

DISTRIBUTION SYSTEM MAINTENANCE

(Guided Discussion
W. E. MacDonald, Chmn.)

Fire Protection Pressures

In answer to questions by the chairman, Mr. Martindale, Supt. at Sudbury, Ont., said that they do not increase pressure on the mains during fires because of the likelihood of increasing leaks in the mains and damage to consumers' services. They prefer to depend upon fire pumpers. The same view is held by F. J. Veale, Supt. at Hamilton. However, more pumps are put on the line to keep up with the fire pumpers. Mr. Graham, representing the Fire Underwriters of Canada, said that with modern fire pumpers volume of water at the hydrant is the only criterion. If the mains are too small to maintain a positive pressure at the hydrant during pumping then more pressure at the pumping station is necessary in lieu of an elevated tank or some other form of distribution storage. Mr. Field, a Canadian fire hydrant manufacturer, decried the lack of standardization of hydrant nozzles in Canada. He pleaded for greater care of hydrants and systematic operation, inspection and maintenance.

Leakage Surveys

Very little Canadian experience in leak detection surveys was forthcoming, so the chairman called on W. W. Brush for U. S. experiences. Mr. Brush reviewed New York City's routine leak surveys, conducted by 12 gangs using the "Aquaphone" and "Pitometer". To use the Aquaphone effectively under New York's conditions of many noises a 6-month training period of the user is required. The cost has been $3.00 to $5.00 per million of leakage stopped. Mr. Brush thought that even as much as $40.00 per million for leakage stopped would be justified.

Programmers

T. Hodkinson
Supt., Towland
Constr. Co.
London, Ont.

J. Clark Keith
Gen'l Mgr.
Utilities Comm.
Windsor, Ont.

J. H. Harrington
Chemist
Water Dept.
Montreal

N. G. MacDonald
Cons. Engr.
Gore & Storrie
Toronto

C. G. Richardson
Vice-Pres.
Builders-Prov.
Providence, R.I.

Mr. Hooper of Ottawa reported use of 2 inch meters for detection of leakage. The meter is connected between two fire hydrants. The water that flows from the hydrant on the "live" section of the grid system into the hydrant located on a "dead" section of the grid which has been valved off indicates the probable leakage, since the test is conducted between midnight and dawn. In conjunction with this checkup surveys for waste on consumer's premises are made.

WATER PURIFICATION SESSION*

(Chairman, I. P. Macnab, Halifax, N. S.)

"Water Purification Practice in Quebec," by Theo. J. Lafreniere, Chief Engineer, Ministry of Health, Province of Quebec, Montreal.

The Quebec Ministry of Health was organized in 1886 and its practices are similar to those of State Health Departments in the U. S.

Pressure filters were first installed in the Province of Quebec in 1895 by the town of Longuevil; hypochlorite treatment for disinfection was first utilized by the city of Montreal in January 1910; mechanical gravity filter installations were made beginning in 1912.

The Province of Quebec now has 69 filtration plants, which serve a population of 1.5 million. Filter installation generally includes air wash. Supplies treated only by chlorination serve an additional 0.5 million population. The typhoid death rate has been reduced from 35 to less than 1.5 per 100,000.

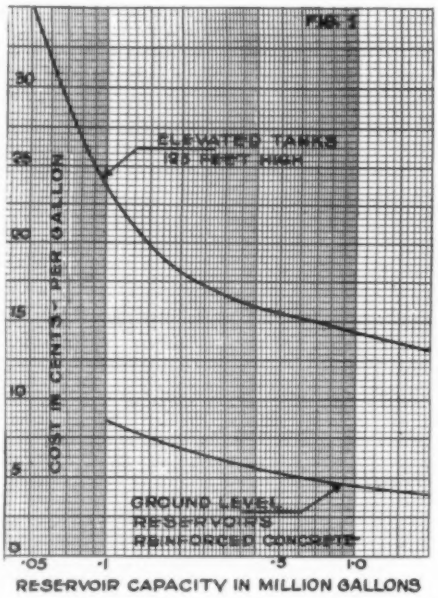
A unique system of water quality control has been developed by the laboratory division of the ministry. Using specially designed kits, local health officials send water samples by mail to the laboratory in Montreal for bacteriological examination. The provision of public water supplies for Quebec's smaller municipalities through government aid is now being investigated.

"Laboratory Procedures in Water Examinations with Reference to Water Standards," were discussed in a paper by M. H. McCrady, Director of Labs. and Jacques Archambault, also of the Ministry of Health, the paper being presented by the senior author.

Mr. McCrady stressed the significance of the new Standards of Water Analysis, discussing the changes developed from those first presented in 1914 to the Ninth Edition in 1946. The majority of the comment was devoted to changes in bacteriological standards and particular reference was made to the evolution of Brilliant Green Bile as a very satisfactory confirmatory test media.

"Problems in Water Purification" was the title of a guided discussion symposium in which J. H. Harrington, Supt. of Purification, Montreal, acted as chairman. Prepared comments were presented as assigned topics and these were followed by open discussion.

Plant practices were described with reference to effective methods for washing filters, suitable filter underdrainage systems, and problems in corrosion control. Much interest was evident in discussions of coagulation procedures and in experiences with chlorine as an aid to water filtration practices.



Comparative Costs of Elevated Tanks and Grcund Level Concrete Reservoirs Oldest Member

At Welland, Ontario, according to a report presented by Mr. Street, prechlorination has been found very effective in improving coagulation and in reducing bacterial growths which formerly occurred both in the coagulating basins and in the filter units.

At Hamilton, Ontario, the use of chlorine to clean rapid sand filters has been developed and was reported by Mr. Matheson. When it was found that the entire prechlorination residual was being consumed in passing through the filters, the prechlorination dose was first reduced and postchlorination was added—but the chlorine demand of the filtered water was increased by this procedure. Laboratory studies of the filter sand disclosed that nitrifying bacteria present were converting ammonia in the water to nitrites, and that five pounds of chlorine was consumed in oxidizing each pound of nitrite to nitrate.

After determining how to employ chlorine for the effective cleaning of one filter unit, all twelve filters at this plant have been treated by the following procedure: (1) the filter is washed, (2) then water containing 200 ppm. of chlorine is applied, (3) given six hours of contact, (4) the filter is drained, and (5) this cycle is repeated. In the subsequent washing operation, large amounts of dark brown material are discharged. Some 300 lb. of chlorine per filter was required to eliminate the chlorine demand of the filters.

In discussing the uses of chlorine as an aid to filter plant operation, Mr. Faber, Chlorine Institute, New York, described the mechanism of prechlorination as influencing the formation of floc, as reducing the bacterial load of the filters, and as a means of controlling tastes and odors. The action of chlorine in maintaining filters in good condition was elaborated upon. It was pointed out that modern practice recognizes the importance of the amount of residual chlorine and, especially, the type of residual chlorine (whether it exists as free or combined available chlorine). Routine use of the orthotolidine-arsenite (OTA) test given in the latest edition of standard methods was advocated by Mr. Faber as the most satisfactory method of determining the type of residual chlorine and the adequacy of chlorination.

RESERVOIR ECONOMICS

"The Most Economical Construction and Use of Reservoirs and Elevated Tanks" was discussed in an illuminating paper by N. G. McDonald of Gore & Harrie, Engrs. of Toronto.

Mr. McDonald, in pointing out the advantages of distribution storage, stressed the possibilities of pumping only on off peak low electric rate hours. He also related cases in which the newer, less expensive Diesel engines had been installed to provide additional pumping during the two or three hours of electric system peak load, and thus avoid the costly peak demand charge of the electric utility. In

*Reported by Harry A. Faber, Editorial Associate and Research Chemist, The Chlorine Institute, New York.

Fred Hills
Member
Util. Comm.
Peterborough, Ont.

M. Pequegnat
Supt.
Water Comm.
Kitchener, Ont.

Louis Crepeau
Director
Public Services
St. Hyacinthe, Que.

Wm. Keene
Supt.
Services
Point Claire, Que.

A. Farquharson
Manager
Utilities Comm.
Brockville, Ont.

reply to a question, he said that the Diesel engine was selected rather than a gasoline engine because of operating economies, since the newer Diesel cost but little more than heavy duty gasoline engines. One ctiy had reduced its pumping costs by $1,850,000 in the first year as the result of using the Diesel engines for peak load pumping.

To permit use of off-peak power only, the reservoir or tank should be at least 10% larger than is indicated by the peak water demand rate. For fire protection alone the capacity should be 10 to 50% above the average of the maximum demand month. For both, he gave the following formula:

$$\text{Reservoir or Tank Capacity} = aD + bD + \frac{10}{24}(D + F - S)$$

in which
- D = avg. domestic demand per day
- a = balancing
- b = off-peak pumping
- 10 = hours of supply
- F = fire service demand

In discussing the economics of reservoirs vs. standpipes vs. elevated tanks, Mr. McDonald stated that where a water level more than 60 ft. above ground level is required the standpipe is less economical than the elevated tank under most circumstances. In choosing the most economical point for erecting an elevated tank or standpipe or reservoir it becomes a matter of expenditure for the connecting mains as against the increased cost of the tank tower. He then presented the accompanying graph for comparing the costs of elevated tanks with ground level tanks or reservoirs of concrete. He noted that the cost per gallon of storage capacity for small tanks took a very sharp rise for units of under 100,000 gal. capacity. At the latter capacity the cost per gallon of capacity for a tank on a 125 ft. tower was about 24c as against 7c for the concrete structure. For larger tanks the cost differential becomes much less but at 1 mg. capacity is still about only one-third for the reservoir. The final selection becomes a matter of available ground elevation and the cost of connecting mains and appurtenances vs. the greater cost of the steel structure can be located at almost any desired point on the system. Mr. McDonald also commented on the increasing attractiveness of elevated tank design which had gone far to eliminate an objection of earlier times to such structures.

SANITARY MAINTENANCE OF RESERVOIRS

(Guided Discussion
N. J. Howard, Chmn.)

In a discussion of the sanitary control and maintenance of service reservoirs Mr. Howard recounted the possibilities of secondary pollution of purified water in open service reservoirs and tanks, also the vitiating effects of algae growths. The best corrective is the covering of all service reservoirs which will provide algae control as well as safety and bacteriological quality equal to that of the water leaving purification plants. Next best to covered reservoirs would be automatic chlorination of water leaving the reservoirs and systematic inspection, and cleaning of open tanks and reservoirs.

In the ensuing discussion there was some difference of opinion concerning the question of whether or not the expense of covering reservoirs could be justified. The general conclusion was that the smaller reservoirs or tanks could and should be covered. In any case such reservoirs and tanks should be enclosed with an adequate fence.

As to cleaning reservoirs, it was the opinion that covered reservoirs, including clear water reservoirs at filter plants, had best be left alone since no real justification for their cleaning had been found and men working in such reservoirs were too much of a source of potential contamination and entailed a considerable expense for disinfection on top of the cost of cleaning, when in reality there was very little to clean out.

As to the practicability of attempting to carry residual chlorine through open reservoirs, it was the opinion of **L. H. Enslow,** to whom the question was put, that attempting to maintain residual chlorine in open reservoirs was not practical because the conditions were not constant. On sunny days the chlorine residual would disappear due to the effect of actinic light and on cloudy days there would likely be experienced an over chlorination effect. The chlorine - ammonia (chloramination) process had been used in attempts to maintain residual chlorine in open reservoirs but frequently with ill effects, since the chlorine disappears but the ammonia remains to fertilize algae and produce troubles incident to vigorous algae growths. Concerning covering of reservoirs, Mr. Enslow said that often the cover will result in false security and inspection neglect. Experience has revealed some strange objects in covered reservoirs which were considered to be animal tight. Especially subject to the possibility of animal entry are those reservoirs with covers at or just above ground level.

Dr. Henrik Jordan
President
and
J. Britton, Rep.
Canada Valve & Hyd. Co.
Brantford, Ont.

Harry A. Faber
Chlorine Institute
New York
and
Harold Woolidge
Wallace & Tiernan Co.
Toronto

E. V. Buchanan
Manager
Utilities Comm.
and
R. W. D. Lewis
Commissioner
London, Ont.

D. A. Sinclair
and
L. J. Gordon
Members
Utilities Comm.
Lindsay, Ont.

H. C. Robinson
Secy. & Treas.
and
Robt. T. Manning
Chairman
Pub. Utilities Comm.
Dundas, Ont.

PUBLIC RELATIONS IN WATER UTILITIES

(Guided Discussion
J. W. Churchill, Chmn.)

In opening the discussion of the important topic of "Public Relations", J. W. Churchill, Chief of the Accounting Dept., Public Service Comm., Halifax, N. S., pointed out the importance of developing good relations with employees before advancing to the stage of tackling the problem of better relations with customers or the public at large. He then told of the billing system in Halifax which included a plan of collecting the bills from the customers' banks if the customer elected this method of collection of the monthly utility service charges. Thus the customer was spared the worry of coming to the office to pay the 12 bills during the year, or of writing checks and mailing them to the office. Instead, the bank merely pays the bill and the customer receives the bill marked paid along with his cancelled checks accompanying his monthly bank statement. This "painless" method of payments had been very popular with customers maintaining bank accounts and also had cut the costs of billing and collection.

E. V. Buchanan, Genl. Mgr. of Public Utilities, London, Ont., called upon managers and employers to get over the monopolistic or bureaucratic attitude. He decried the use of the service shut-off stick in making collections and pointed to the bad aspects of nuisance charges in general. These charges are petty collections which create bad relations with the customers and yield too little revenue to warrant making them. London has not missed the income lost while dropping such charges is an excellent method of buying good-will.

O. H. Scott, Manager of Utilities, Belleville, Ont., strongly advocated the avoidance of any favoritism, and the treatment of every customer alike.

Marcel Pequegnat, Supt. of the Water Commission, Kitchener, Ont., told of participation of the water utility in the "Peoples Forum" on the radio, with one night each week devoted to the water works. In Kitchener the Water Commission purchases fire-pumpers for the Fire Dept.

A. B. Manson, Gen'l Mgr., Public Utility Comm., Stratford, Ont., in discussing new employees, said that the first requirement was that the new employee be treated like a man and that he should be made to feel proud of his job. He told of the new scheme in Stratford of holding "Employee's Night" which would be educational as the objective.

C. J. Cote, City Engr. for Sherbrooke, Que., and also Supt. of Public Works, said that their employees are covered by employee insurance and now pensions are soon to be established. Employees are encouraged to hold their own meetings.

R. H. Martindale, Supt. of Water, Sudbury, Ont., described their method of investigating complaints and checking up in a spirit of the customer being right until proven otherwise, this policy being drilled into employees.

Oldest Member
R. J. Smith
Manager
Utilities Comm.
Perth, Ont.
(36 Yr. Member)

30 Yr. Member
R. W. Angus
Cons. Engr.
Toronto
(Hon. Member A.W.W.A.)

J. Clark Keith, Genl. Mgr., Utilities Comm., Windsor, Ont., reported that his commission makes friends by kindly treatment of the customer's lawns; by adjusting high water bills caused by hidden leaks; notification amply in advance to those to be inconvenienced by water main shut-off for any cause. These were just some of the many small things that add up to good or bad customer relations.

Jean Blanchard, Supt. of Water, St. Hyacinthe, Que., said that they do not hesitate to fire any employee who is impolite to customers. Use of the newspaper to tell the public about the water works will solve about 75% of the public relations problems. They encourage customers to allow water to run to waste to avoid service freezing and subsequent troubles for the customer.

Paul Dufrenze, City Engr. for Three Rivers, Que., has found newspaper publicity and articles of more practical value than the radio. He has also found the annual report, prepared for the public's understanding, to be of considerable value. And, he advocates close cooperation with the Fire Dept.

A. L. Dafoe, Supt of Water, Napanee, Ont., is also a believer in the value of the local press, and commented on the great value of the A.W.W.A. program of advancing Public Relations.

WATER RATE STRUCTURES

In discussing water rate structures in Quebec, Alex Larivere, Vice Pres., Provincial Transport and Communication Board, had the following to say concerning rate-structure regulation for privately owned water utilities in Quebec. No control of rates is applied to municipal plants, but the Board does issue orders for improvements needed for municipal water and sewage systems. These orders preclude the necessity for the municipality to have bond issues for such improvements approved by the voters. An example was the orders to Montreal, involving $12,000,000 costs of which $7,000,000 went for sewers and sewage treatment and $5,000,000 for water.

Small water utilities (privately owned) are allowed rate structures based on straight line depreciation with 1 or 2% annually allowed on castiron mains and only 2½ to 4% on galvanized steel pipe. However, to preclude bankruptcy of a water utility the Board sets the rates to provide at least a sustaining income. In valuation proceedings replacement costs are sometimes used but there is no definite rule. Rate structures vary from one community to another because of the rule that rates are allowed to permit of a fair return on capital invested and operating expenditures.

In reply to the question of L. H. Enslow as to whether or not municipalities in Quebec are permitted to issue revenue type bonds for sewerage financing, it appears that this method has not yet been employed in Quebec. Dr. A. E. Berry then explained that the sewer rental method of financing was now in effect in Ontario and most of the new works are being constructed through issue of revenue bonds, with operation financed through sewer rental also.

I. P. Macnab, a member of the Regulatory Commission for Nova Scotia Public Utilities, Halifax, N. S., said that by any reasonable analysis the sewer system in reality constituted a part of what might be considered the water supply and water disposal system, i.e., water in and water out. And, N. J. Howard added that for best management

and economy these twin operations should come under one general head.

ECONOMIES OF WATER METERING

(Guided Discussion
J. C. Keith, Chmn.)

Mr. Keith's opening remarks on the "Economic and Maintenance Problems in Connection with Consumers' Meters" gave some experiences of Windsor, Ont., wherein 99½% metering had reduced water consumption of 254 gpc./day to 79 gpc./day, i.e., "water waste" had been reduced by 175 gpc./day.

Paying $1.12 per hr. for water test and repair men, experience in testing ⅝ in. meters showed a cost of 56c per meter tested and for test and repairs $1.94 per meter.

"Tommy" Hodkinson, former Supt. for London, Ont., said that all new meters should be tested before placing in service and in the case of existing meters the card record should always show test results, both in and out of the shop, as the only way of maintaining a history of the particular meter. As to testing frequency meters 3 inch and larger should be every 2 years at least; 1 inch and 2 inch meters every 3 years; ⅝ inch meters every 5 years. Many could not agree with the need for testing new meters.

O. H. Scott (Belleville, Ont.) related how, rather than remove a meter on the customer's complaint of over-registering, it had proved much more effective in convincing the customer of test results to place a brand new shiny meter in series with the customer's meter while still in service. The comparison of readings on the customer's premises was not only convincing, but this type of service constituted an excellent public relations act.

In discussing repairs to damaged meters, **W. E. MacDonald** (Ottawa, Ont.) said that they install heat-proof discs when meters come into the shop damaged from hot water. The requirement of check valves to prevent hot water back-up to the meter was too dangerous a practice and relief valves did not always function to relieve the pressure checked by the check valve. **T. Hodkinson** (London, Ont.) said that the objection to heat-proof discs was that because of the large clearance these discs would not register low flows. **R. H. Martindale** (Seedbury, Ont.) has a scheme of re-forming discs warped by hot water. The deformed disc is softened in hot water and allowed to cool between metal plates bolted together. Many discs are thus saved.

It was generally believed that the water utility should bear the repair expense for the first hot water damage and the customer should pay for recurrence of damage. Some make a $2 repair charge for even the first damage from frost or heat.

Discussing frost trouble and damage, **F. J. Veale** (Hamilton, Ont.) reported that they still use the old reliable manure cover for meters in the worst spots. Otherwise rock-wool and double pit lids are used.

D. M. Hannah (Windsor, Ont.) said that repeated freezes and thaws filled the space between the frostproof double lids with ice, indicating the great importance of a water tight upper lid. When a customer's meter cannot be located within the building, the customer must pay for the meter box or pit required. **R. H. Martindale** of Sudbury, Ont., where frost problems are no child's play, places meters in 7 to 8 ft. deep pits and uses shiplap and roofing for making the inside (lower) lid, this being superior to anything tried.

As to charges for changing location of meters, in Hamilton, Ont., a simple change is made at the utility's expense, while customer must pay if change is costly. In Belleville, Ont., the customer pays nothing for original installation, but if a subsequent change is requested, the customer must pay, regardless of the amount involved.

It was at this point that **Edw. V. Buchanan,** Gen. Mgr. of London's (Ont.) Utilities, challenged the members to go home and add up all of the revenue received from the minor nuisance charges to customers. Then think of what this income has bought in the way of bad public relations. Unless he was mistaken, the manager who thoughtfully considers this matter would have to agree that the overall results were not really worth the minor income received from these petty charges. So, in London friends for the utility have proved to be worth more than the cash which they hadn't collected since dropping the majority of small charges for "this or that."

A member added: And don't let's forget that our municipally owned water works are in reality owned largely by the customers.

In the discussion of metering records, Mr. MacDonald of Ottawa explained that there should be a customer record, of course, but the other important record was the meter's record or history. Without the latter record of performance, water works managers would have no adequate comparison of the service from meters of various makes. He could not argue adequately for the purchase of a more expensive first cost meter in competitive bidding, unless his records proved the greater long-term value of the more expensive meter. Also records would serve a useful purpose in standardization in metering when the manager becomes satisfied that one or two particular makes of meters give the best overall results under his particular conditions of water quality and maintenance practice.

One member, formerly having more than a dozen different makes of meters to contend with and having now standardized on a single make, was heard to say, "Amen!"

Manufacturers' Brass

Geo. Morgan
Victaulic of Canada
Toronto

Jim Kinney
Wallace & Tiernan
Toronto

At the Montreal Filter Plant

Fred Hills
Peterborough
Jack Diven
Leadite Co.
New York
Tommy Hodkinson
London

W. R. Burr
Commissioner
and
H. G. Stockfish
Mayor
Preston, Ont.
Chas. Merilees
Chatham, Ont.

Just a Gang
Ready for Feed
at the
Montreal
Filtration Plant

SPRINGDALE'S NEW SEWAGE TREATMENT PLANT

Local Industry Contributes to Construction and Operation

by WALTER WILSON
Supt. Water & Sewage Works
SPRINGDALE, ARK.

THE city of Springdale, Ark., has a new sewage treatment works. It is one of the few new sewage treatment plants built in the United States during the past several years. It was built at a cost of $161,000.00 (plus $75,000.00 for sewer extensions) and was designed to serve a population of 21,500 persons.

At the present time the population equivalent load for both domestic waste (3500) and industries is 16,700, and according to estimates the plant will serve the needs of the city until 1960.

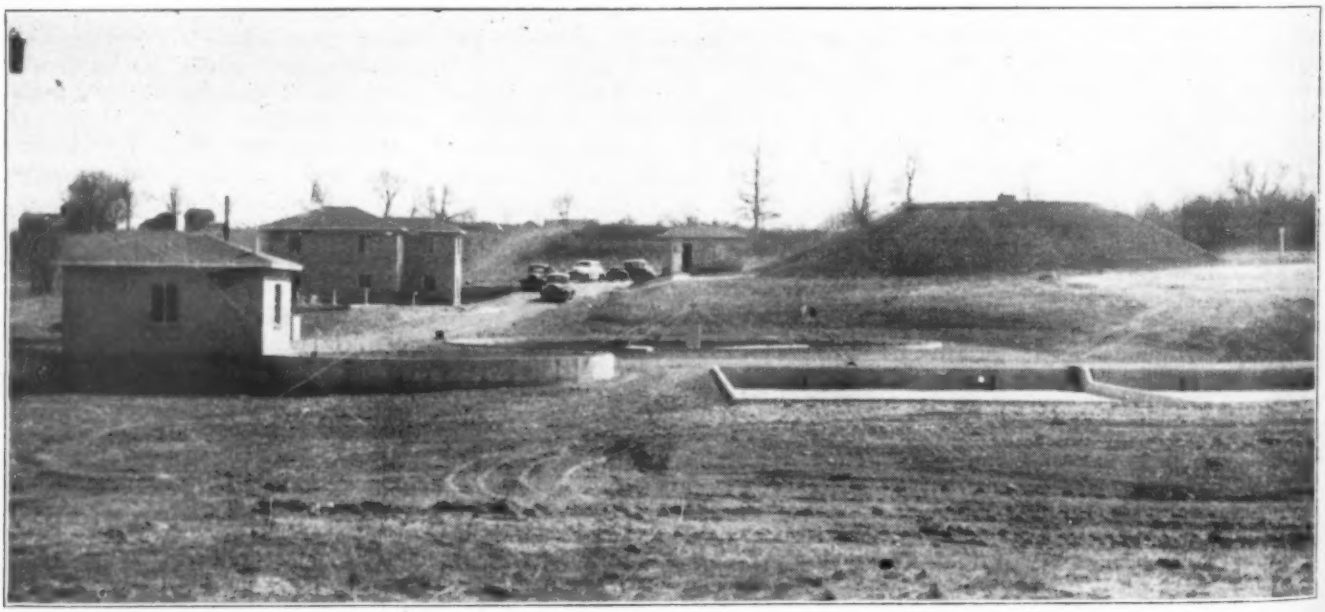
One of the most unique facts about this plant is that Springdale industries participated in the financing of the plant and are also paying a great portion of the monthly operating costs. Local industry put up a total of $55,000 for the job, and one firm alone pays a sewer rental of $152 per month during the months of lighter operation, and an average of $575 monthly when its plant is running at capacity.

The plant consists of sedimentation tanks and a separate sludge digester with high rate trickling filters, providing for recirculation up to three times the volume of sewage and waste reaching the plant.

The treatment plant was designed by the firm of Marion L. Crist and Associates of Little Rock, Ark., and its operation will be supervised by Walter Wilson, Water Superintendent, who now becomes a member of the "dual personality club" composed of superintendents of both water and sewage works. The plant went into operation on March 1, 1947.

The Contractor Turns the Keys Over to City

(Left to Right) Walter Wilson, Supt. Water & Sewage Works; Joe Steel, Chairman Water & Sewage Committee, Springdale Council; Don Pray, Contractor; Marion L. Crist, Consulting Engineer, Little Rock, Ark.



The New Sewage Treatment Plant—Springdale, Ark.

One of the very few municipal treatment plants built since the U. S. went to war went into operation March 1, 1947.

HYDRAULICS FOR THE PRACTICAL WATER WORKS MAN

The Ninth of a Series of Articles

Measurement of Discharge Through Pipes

By ROBERT W. ANGUS, M.E.
Consulting Engineer
TORONTO, CANADA
(Professor Emeritus of Mechanical Engineering, University of Toronto)

UNDER this heading only pipes running full of liquid, or *closed pipes* as they are called, will be discussed and the treatment of pipes flowing partly full, as in ordinary sewers, drains, etc. will be deferred to a later article.

For all small pipes and for a good many large ones, meters of the disc, helical, compound or other similar type are in common use and are familiar to the water works man, so that they need not be described here. The construction of them has more to do with mechanical problems than with hydraulics. Such meters must, of course, be calibrated from time to time, and the loss of head checked, and this should be routine practice in water works operation. There are, however, many metering devices that depend upon the hydraulic principles considered in these articles and some of these devices will now be given attention.

The Venturi Meter

The nozzle was referred to in the last article, but it would be better to start with what is probably the best known measuring device; that is the Venturi meter, so generally used on main lines and in pumping stations, where the output of the pumps is measured and recorded. This meter was mentioned in our first article and its construction is well known to consist of two conical pieces with a short cylindrical piece between them—(Fig. 32). It simply forms part of the pipe line, and its outstanding feature is that it offers extremely little resistance to the flow.

The Author

The up-stream cone has its inlet end the full pipe diameter and tapers down fairly rapidly to the size of the cylindrical throat piece attached to it. The cylindrical throat is, in turn, coupled to an expanding cone, of rather small taper, and with its outlet end the full size of the pipe again. The cones are usually smooth castings but the water passages are not machined, while on the other hand the throat piece is bored smooth and to an exact size and its connections to the two conical pieces are carefully rounded off so that the whole meter will offer the least possible resistance to the flow.

The outline of such a meter with cones of a usual taper is shown in Fig. 32. As illustrated, it is used in a horizontal pipe, which is the usual practice, although the Venturi tube may be placed in vertical pipes or those sloping at any angle. As these meters are made by different builders, their proportions vary considerably. Since the discharge through any particular size of Venturi tube depends directly on the extent of the drop in pressure ($H = p_1 - p_2$) in feet between the entering end of the up-stream cone and the lesser pressure at the throat, builders of the meter

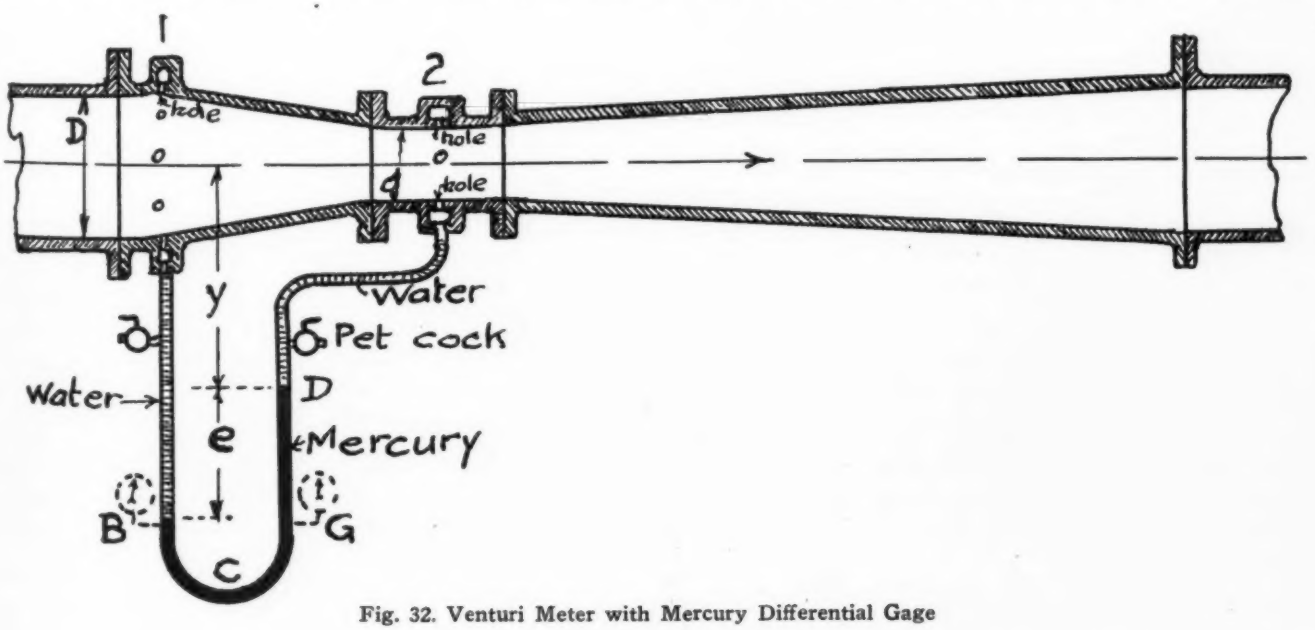


Fig. 32. Venturi Meter with Mercury Differential Gage

have devoted much thought and care to the accurate measurement of this pressure drop.

Hollow rings surround the meter at the pressure measuring points, as shown on the figure, and a number of holes are drilled so as to connect the inside of these rings with the inside of the meter, thus insuring that the pressure on the inside of each ring is an average of all the pressures around the meter wall at these particular points. Much study has been given to the design of these pressure holes which must not be large and must have the burrs removed from the inner end of them, yet without appreciable rounding of their inner edges.

Theory of the Venturi Meter

The theory of the meter is very simple. Taking the horizontal one illustrated, the datum may be assumed along the axis of the tube, and if we write down the different heads, using the sections 1 and 2 of Fig. 32, we get the equation:—

$$p_1 + \frac{V_1^2}{64.3} = p_2 + \frac{V_2^2}{64.3} + F$$

where **F** is the friction loss from point 1 to point 2; that is, in the up-stream cone. Our practice in this series of articles has been to express **F** in terms of the velocity head, but for some reason it has been the custom, in connection with this device, to express **F** in terms of the pressure drop **H.** That is to say, **F** is written equal **bxH,** where **b** is a factor which depends on the smoothness and proportions of the meter. This method simplifies the meter formula. Further

$$V_1 = \frac{A_2 V_2}{A_1}$$

or, in terms of diameters **D** and **d** we have

$$V_1^2 = \left(\frac{p}{D}\right)^4 V_2^2$$

and the equation becomes

$$H = p_1 - p_2 = \frac{V_2^2}{64.3} - \frac{V_1^2}{64.3} + F$$

From this it is easy to write the relation

$$V_2 = C \frac{1}{\sqrt{1 - \left(\frac{d}{D}\right)^4}} \sqrt{64.3\ H}$$

The letter **c** has been written instead of $\sqrt{1\text{-}b}$. The quantity **c** is called the meter coefficient and for throat velocities exceeding 10 ft. per sec. its value is usually less than 0.99 in most meters of ordinary sizes and proportions. For the small meters **c** decreases rather rapidly for the low throat velocities and particularly those under 5 ft. per sec.

Since these articles are written for practical water works men and not for experts on metering, a discussion on the exact value of **c** for any case will not be given but those interested will find full data in the report of the Fluid Meters Committee of the American Society of Mechanical Engineers, available by applying to the Society at 29 West 39th Street, New York 18, N. Y.

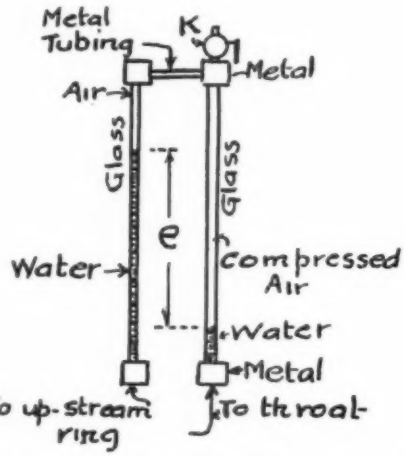


Fig. 33. Inverted Differential Gage with Metal Fittings

For meters in pipes over two inches diameter, where the throat velocity exceeds 5 ft. per sec. the value is between 0.97 and 0.99 in almost every case, the higher values belonging to the larger meters. A meter for a given sized pipe is usually selected so that the throat velocity, within its range of working, will lie between 3 and 30 ft. per sec., the extreme values being avoided as far as possible. The throat diameter is usually between one-half and one-third of the pipe diameter, but the ranges vary and the builders should be consulted on this point.

The discharge through a meter in a 30 in. pipe where the throat diameter is 15 in. and pressure differential is H = 9 ft. of water is found as follows The quantity

$$\frac{1}{\sqrt{1 - \left(\frac{d}{D}\right)^4}} = \frac{1}{\sqrt{1 - \frac{1}{16}}} = 1.032$$

is usually referred to as the "velocity of approach factor" since it takes into account the approaching velocity of the water in the pipe. Putting this value in the meter formula and taking c as 0.99 (a good value for this case) gives the relation

$$v_2 = 1.032 \times 0.99 \sqrt{64.3 \times 9}$$

from which the throat velocity is found to be 24.58 ft. per sec. Since the area of the 15 in. throat is 1.227 sq. ft., the discharge is 1.227x24.58 or 30.16 cu. ft. per sec. This corresponds to 19.54 million U. S. gallons per 24 hours.

The pressure difference p_1-p_2 or **H** can, of course, be taken by putting pressure gages at points 1 and 2 (Fig. 32) and then subtracting their readings. Such a method is not very accurate because the pressures are usually large and their difference small and any slight errors in reading the gages give a proportionally large error in **H.** As a general rule, the differential is read directly on a *differential gage* the simplest form of which is shown attached to the meter in Fig. 32. In this simple form it is a U-shaped glass tube, the two legs of which are shown connected with the pressure points by metal tubing or rubber hose.

Differential Gage

To explain the action of the differential gage, suppose that water is flowing through the meter; then the part B C D of the gage should contain a liquid that will not mix with the water, mercury being frequently used for the purpose. Extreme care must be taken to fill the connecting tubes with water from the pipe and to see that this water is free of air bubbles or foreign matter; this is accomplished by opening the pet cocks shown and allowing water to flow freely through the tubes till all air and dirt are driven from them. If either pressure is less than atmospheric, this process must be modified. On the drawing, in dotted lines, imaginary pressure gages are shown attached to the U tube at the points B and G, and a little thought will convince the reader that both of these gages will show the same pressure because there is no flow through the U tube. Obviously if one of the gages read higher than the other, the mercury in the part B C G would flow toward the point of lower pressure and there would not be equilibrium of the mercury in the differential U tube gage.

But the imaginary gage at B reads $p_1 + y + e$ feet of water since there is nothing but water in the connecting tube, and the imaginary gage at G would indicate a pressure $p_2 + y + e$ feet of water if all the liquid between G and the

meter was water. Actually, however, the part **e** is mercury, a liquid 13.6 times as heavy as water, and, therefore the pressure produced by e feet of mercury would be the same as that produced by a water column 13.6 times as high. It is therefore possible to write the relation $p_1 + y + e = p_2 + y + 13.6e$, or $H = p_1 - p_2 = 13.6e - e$ or $12.6e$. If **E** is the number of inches corresponding to e feet, then $E = 12e$ and the differential $H = \frac{12.6\,E}{12}, = 1.05\ E$

That is **H** is just 1.05 times the differential in inches shown in the U tube. Thus, if the U tube had been attached to the meter given in the illustration above it would have shown a difference of

$$\frac{9}{1.05} = 8.57 \text{ inches}$$

Obviously the height y does not affect the result and the gage may, therefore, be placed above or below the meter and at any convenient distance from it without affecting its reading. The same theory will apply to all positions, but minus signs would have to be placed before the y terms if the gage is *above* the meter. The reader should use the theory to prove for himself that the gage will read the same on the meter for a given discharge irrespective of whether the meter is vertical, horizontal or sloping.

Inverted Differential Gage

For very accurate work the author has used the differential gage in a somewhat different way, as illustrated on Fig. 33. The connections are made in the same way as before but mercury is not used and the gage is inverted. Air under pressure is forced in through **K** till the water in the two sides of the gage separates, as illustrated. Using the same theory as before it will appear that the differential **e** is the head **H** to be used in the formula. (Actually the weight of air in the right hand leg should be allowed for but it would produce no significant change in **H**).

Using the gage in this way on the meter mentioned would give a difference **e** of 9 ft., as compared with 8.57 in. if mercury is employed, and while this means a very much larger gage, it also means improved accuracy, since there is bound to be some error in reading **e** and the percentage error will be less with the greater difference **e**.

The differential gage is very extensively used, particularly where great accuracy is desired or where the pressure drop being measured is small. For very small pressure differences, such as are often encountered in friction and velocity head measurements, the inverted gage is very common, but some such fluid as kerosene is forced into the top of the gage instead of the compressed air already mentioned. The kerosene does not mix with the water, and differs little from it in weight per gallon, with the result that the differential **e** on the gage becomes much greater than **H**, thus magnifying the readings very much. For example, kerosene weighs about 0.82 times as much per gallon as water and the theory already explained for the mercury gage may be adapted to this case by placing 0.82 instead of the 13.6, but since the gage is inverted the signs must also be changed so that the formula will read 1-0.82 instead of 13.6-1. The net result is that with the inverted kerosene gage **H** is 0.18e, that is to say, an actual pressure drop of 1.8 in. would show 10 in. on the gage.

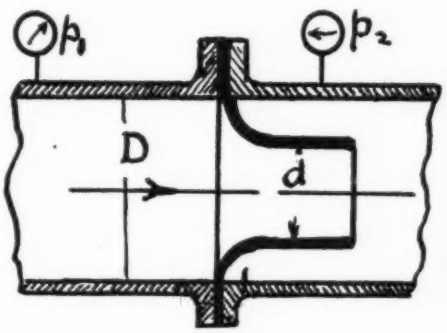


Fig. 34. Flow Nozzle

In exact experimental work, and also in practice, the principle just given is in common use and by employing various liquids of suitable weights the differential may be magnified as much as desired. The magnification will be greatest with a liquid nearly the same weight as water.

The makers of Venturi meters also supply indicating and recording instruments along with them, these devices showing directly the total, as well as the rated flow. Most of them are differential gages using mercury but the U tube is enlarged at both ends so that floats may rest on top of the mercury in both legs, these floats being connected to a mechanism above which the square root of their difference in levels is automatically extracted, and converted into gallons per day or other desired units. Details of the recording instruments may be obtained from the makers. Those who do not want to make their own differential gages may purchase them, those sold being usually part metal so that straight glass tubes may be used in them.

Flow Nozzles

In the previous article of this series it was stated that nozzles are often used as accurate flow measuring elements and an illustration of one placed on the end of a pipe was given as Fig. 31. More commonly they are inserted *in* the pipe line between two flanges as shown in Fig. 34, but if great accuracy is desired the nozzles must be of correct shape and extreme smoothness. Furthermore, the position of the pressure connections must be accurately located. Some meter builders make flow nozzles, and as they have had much experience in their design, and have determined the coefficients for them, it is best to consult them. The coefficients they use have been determined for special positions of the pressure taps, and are not correct for any other positions.

The formula for the flow nozzle is exactly the same as for the Venturi meter. In fact, the main difference between the two instruments is in the omission of the long expanding down stream cone in the case of the flow nozzle. The expanding cone of the Venturi tube has little effect on the measuring qualities but its important feature is that it does cause a reconversion of the high throat velocity energy into pressure head and, thereby, reduces the over-all loss of head in the device to a small value.

Checking Meter Indicators

The indicating device used with both of these meters may easily be checked in place by the station operator. The meter must first be examined to see that it is clean and undamaged and that the pressure openings are in good condition. After the valves in the pipes connecting the meter to the indicator are closed the plugs in the indicator stand, close to where the connecting pipes join it, may be removed. Vertical, open topped glass tubes not less than ⅜ in. bore are connected to these plug holes (using short rubber connectors if necessary) so that the tubes are conveniently close together.

Water is then poured into the top

of the glass tubes till the level in the one connected to the upstream end of the meter stands, let us say, 2 ft. above that in the glass tube connected to the throat. This corresponds to a differential of 2 ft. on the meter, and by using the meter formula the flow corresponding to this differential may be calculated and compared with that shown on the indicator. It is best to carry this out for several differentials and if the dial does not indicate correctly it is usually advisable to get help from the meter maker. In making this check the greatest of care must be exercised in freeing all pipes and connections from air bubbles, (by no means an easy job), since just a very little air will produce erroneous readings.

The Orifice Meter

The Orifice Meter will be explained and discussed in Professor Angus' next article of this series, along with his discussion of orifices in general as flow measuring and as flow control units in the application of chemical solutions to water, sewage, etc.

—Editor.

WATER AND SEWAGE PATENTS

(Of Recent Issue)

WATER PATENTS

Chlorinating Apparatus. Paul Raymond Dodd, Maryville, Tenn. (50 per cent to I. D. Kenner, Mooresburg, Tenn.); U. S. 2,418,628; April 8, 1947 (Appl. 12-13-44). A water purifying apparatus consisting of a water tank, a chlorine tank located above and a pipeline connecting said tanks, whereby compressed air is directed from the water tank to the upper tank and chlorine from the upper tank to the water tank partially through the same pipeline and at the same time, said means including another pipeline connected to the first line at two divergent points, with check valves in each line and a needle valve in one line and cut-off valve in the other.

Device for Cleaning Pipe Lines. Cecil J. Haynes and Saint Elmo Swain (to Standard Oil Development Co.); U. S. 2,418,880; April 15, 1947 (Appl. 6-10-44). A pipe cleaning device adapted for longitudinal movement through a pipe, with scraper element caused to rotate by the flow of the fluid.

Settling Tank. John A. Montgomery (to Lakeside Engineering Corp., Chicago, Ill.); U. S. 2,418,880; April 15, 1947 (Appl. 6-12-44). A settling device consisting of a circular tank having a vertical cylindrical wall and approximately flat bottom, with a cylindrical skirt dividing the tank into an annular ring and a central clarifying chamber with inlet to discharge incoming liquid into annular ring down to the bottom and up through the clarifying chamber and out over a weir.

Tank Structure for Liquid Treatment. Lawrence W. Bierker and Edward W. Welp (to Graver Tank & Mfg. Co., Inc.); U. S. 2,419,004; April 15, 1947 (Appl. 6-9-44). A specially designed circular tank with means for recirculating treated water through precipitated sludge to aid in filtration of sludge particles produced by chemicals introduced.

Centrifugal Pump. Fred Miess, Gary, Ind.; U. S. 2,419,905; April 29, 1947 (Appl. 6-6-44). A sump pump.

These patent abstracts being brief do not necessarily cover the entire scope of the invention described. If the reader becomes especially interested in any of these patents he should obtain printed copies of the complete patent, at 25 cents each, from the Commissioner of Patents, Washington 25, D. C.

Centrifugal Pump. Ivan M. Prokefieff, Staten Island, N. Y.; U. S. 2,420,401; May 13, 1947 (Appl. 6-8-45).

Purification of Fluids With Cation Active Resins. James R. Dudley (to American Cyanamide Co., New York); U. S. 2,420,419; May 13, 1947 (Appl. 3-30-44). A process for removing cations from fluid media by treating with a granular water-insoluble material having a particle size less than 8 mesh. The material is produced from furfural and a mineral acid halide selected from a group consisting of sulfuryl chloride and phosphorus oxychloride.

Self-Priming Centrifugal Pump. Augustus C. Durdin, Jr., Lincolnwood, Ill.; The Northern Trust Co., executor of said Augustus C. Durdin, Jr., deceased; U. S. 2,420,420; May 13, 1947 (Appl. 10-7-43).

SEWAGE PATENTS

Traction Drive for Liquid Treating Apparatus. Carl H. Nordell (to Infilco, Inc.); U. S. 2,418,189; April 1, 1947 (Appl. 8-23-41. A settling tank with overflow weir and solids scraper operated by a traction drive wheel below the weir.

Sewage Treatment. Walter H. Green (to Infilco, Inc.); U. S. 2,419,492; April 22, 1947 (Appl. 7-1-43). A method of sewage treatment by the activated sludge process in two stages with the solids in the first clarifier discharged to waste, passing the clarified effluent to an aeration unit and a portion of that effluent through another aeration step with sludge from the second step returned to the aeration step.

Sewage Disposal System. Leo Charles Short and Ewald A. Iwen (to the Austin Co., Seattle, Wash.); U. S. 2,419,693; April 29, 1947 (Appl. 1-29-43). A sewage treatment system with a sump arranged to receive influent at varying or random rates, a filter bed above said sump, a means for recirculating filter effluent from the sump to the filter.

Sewage Disposal. James O'Donnell, Los Angeles, Calif.; U. S. 2,420,326; May 13, 1947 (Appl. 3-20-42). A septic tank having an inlet and a siphonic outlet lower than the inlet, a vertically movable buoyant receptacle having an imperforate bottom and sides with perforations therein above the bottom for receiving the admitted sewage, and a buoyant rim to keep the receptacle afloat regardless of accumulated waste.

ACTIVATED CARBON TREATMENT OF AN OPEN RESERVOIR*

Proves Practical as Taste and Odor Control Measure Without Benefit of Filtration

By

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BOSTON, MASS.

and

JAMES STUDLEY
Supt. of Water
ROCKLAND, MASS.

ACTIVATED carbon was successfully applied to Great Sandy Bottom Pond as a treatment for taste and odors without subsequent filtration of the water. Nevertheless, none of the carbon reached consumers' taps. The treatment in conjunction with the use of copper sulphate was effective in eliminating taste and odors from the joint water supply serving 16,000 customers at a rate of about 1 million gallons per day in the Towns of Abington and Rockland, Mass.

Great Sandy Bottom Pond

Great Sandy Bottom Pond, shown in the accompanying sketch, is the source of water supply for the two towns and lies in the Town of Pembroke, Mass., about 5 miles away.

*A paper presented before the New England Water Works Assn. and here presented by permission of the Association.

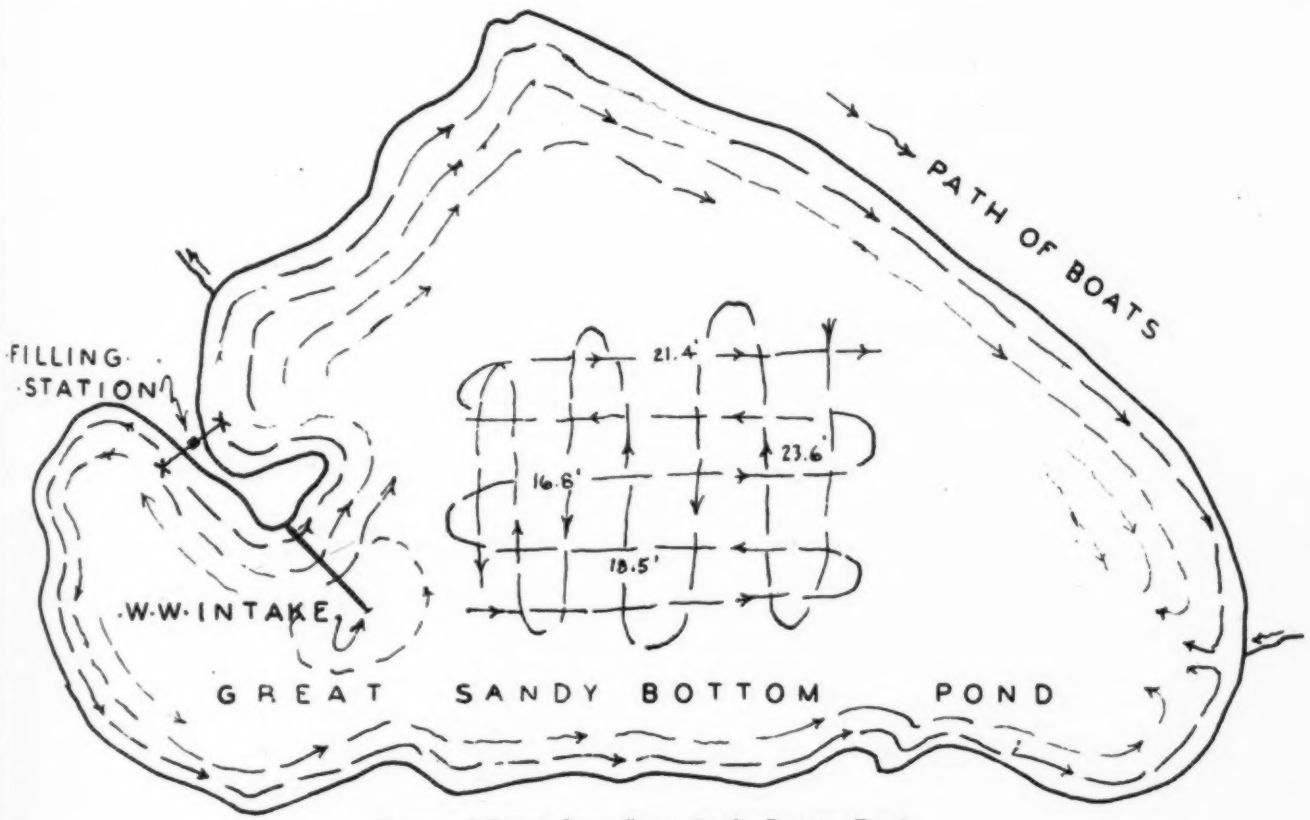
Howard E. Bailey

Tributary to the Pond is Little Sandy Pond, about one-half mile above, with a cranberry bog located on the stream between the two ponds. The area of Great Sandy Bottom Pond is approximately 108 acres and the capacity 350 million gallons at high water. At the time the treatment was carried out there were approximately 300 million gallons in the pond.

The maximum depth of the pond is 23 feet at a location several hundred feet north of the intake, where the depth of water over the 24-inch cast iron intake pipe is only 6 feet.

Early Troubles With Taste and Odors

The water supply system was established in 1885, and no trouble was experienced as of record until 1908. Again in 1927, tastes and odors were apparently aggravated by use (or misuse) of chlorine for a period of two or three years. In 1934 the taste and odor trouble was definitely attributed to the growth of algae. There were intermittent troubles between 1938 and 1944, when the quality of the water varied from "good to bad."



Course of Boats Over Great Sandy Bottom Pond
(*Area*, 108 *Acres—Vol.* 300 *Mg.*)

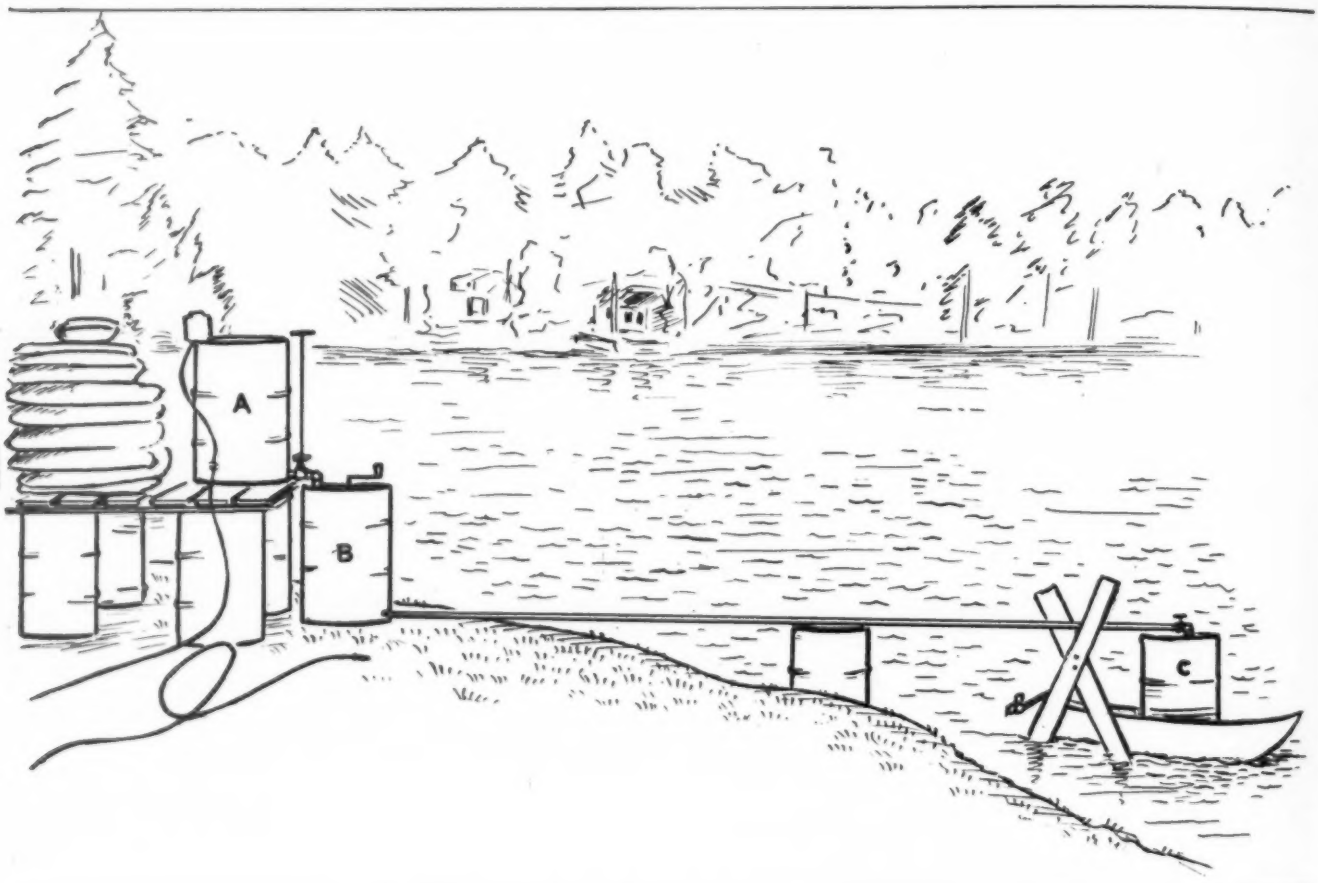
In the spring of 1944, tastes and odors which were described as "pig-pen" and "fishy" were recorded. A treatment of 7,000 lbs. of copper sulphate, or approximately 3 parts per million, made no change in the quality of the water, it is understood, but required removal of dead fish from the reservoir at a cost of $300. With the colder weather in December and the formation of ice, the tastes and odors disappeared.

In the spring of 1945, tastes and odors became prominent early in the year. In January staurastrum was present in 894 Areal Standard Units. In April 910 units of clathrocystis appeared in water samples from the pond, but in the tap water at the pumping station 2,310 units of the organism appeared.

Treatment With Activated Carbon

Since the Towns of Abington and Rockland had no other source of supply and the use of copper sulphate alone was not effective, the question arose as to whether activated carbon could be used to remove the taste and odors. The important question was: would the carbon stay in the pond and not require filtration before the water entered the distribution system? The customers apparently had no objection to the addition of "purifying charcoal," as they called it, to the water supply.

Upon advice from the carbon manufacturer, copper sulphate was first applied to the open reservoir, followed in a day or two by activated carbon. The chemicals were applied from two outboard motorboats following a route around the shore in the shallow water and the usual criss-cross pattern in the deeper areas—see accompanying sketch.



Sketch Showing Arrangements of Carbon Treatment Plant

Dosages

On July 24, 1945, the calculated dosage of 0.6 ppm. of copper sulphate (1500 lbs.) was applied to the pond by the usual method of dragging burlap bags filled with crystals behind an outboard motorboat. Early in the morning of July 25th, a breeze was blowing over the pond, accompanied by an unpleasant odor of fish. The turbidity of the water was high and water drawn from the tap in the pumping station was distinctly unpalatable. By 1 p. m., 1000 lbs. of activated carbon had been introduced into the pond water, as later described, with the result that a reduction of the fishy odor was promptly observed. By 8 o'clock in the evening, a total of 3000 lbs. of carbon had been distributed by outboard motors, corresponding with a dose of 1.25 parts per million. No carbon was distributed within 100 feet of the intake.

Results

On July 26th, the morning after the carbon treatment was completed, no taste, odor or turbidity was observed in the tap water at the pumping station, nor did any carbon appear in water samples drawn.

The intake screens in the pump well were covered with a gelatinous mass which was flecked with carbon particles but did not pass through the screen. During the first day after carbon treatment, the screens required washing at one-half hour intervals, where previously the screens were washed only once daily. The gelatinous clogging disappeared the next day and did not again appear when copper sulphate or carbon was used alone.

The turbidity decreased and disappeared within a few days.

A gelatinous mat, with a thickness of about ½ inch, covered the bottom of the pond. A microscopic analysis indicated that this was composed of amorphous matter and that no live algae were present.

The chlorine consumption (demand) dropped 3 to 4 pounds per million gallons.

Tastes and odors disappeared all over town one week later.

Sandy Bottom Pond six months later was again clear and the sand reappeared clean over the shallow areas of the pond.

Recurrence of Tastes and Odors

A recurrence of tastes and odors was expected and on August 6th 2000 lbs. of activated carbon were added when a slight taste began to appear at the pumping station tap. On this and later occasions no attempt was made to stay clear of the vicinity of the 24 inch pipe intake in the distribution of carbon. The pond water remained without tastes and odors for remainder of the year. As a precaution, just before the ice formed, a dose of 0.4 ppm. of copper sulphate was added on November 16th, and 1.25 ppm. of carbon on November 17th and 18th. In the spring of 1946 a slight taste was evident and a repeat treatment of 900 lbs. of copper sulphate and 3000 lbs. of carbon was made on April 17th and 18th.

In the fall of 1946, when the cranberry bog was drained, the water entering the pond had a color of 180 and spiragyra was present in 2400 standard units. As a precaution, the above copper sulphate and carbon treatment was repeated on August 21st to 23d.

METHOD OF APPLYING CARBON

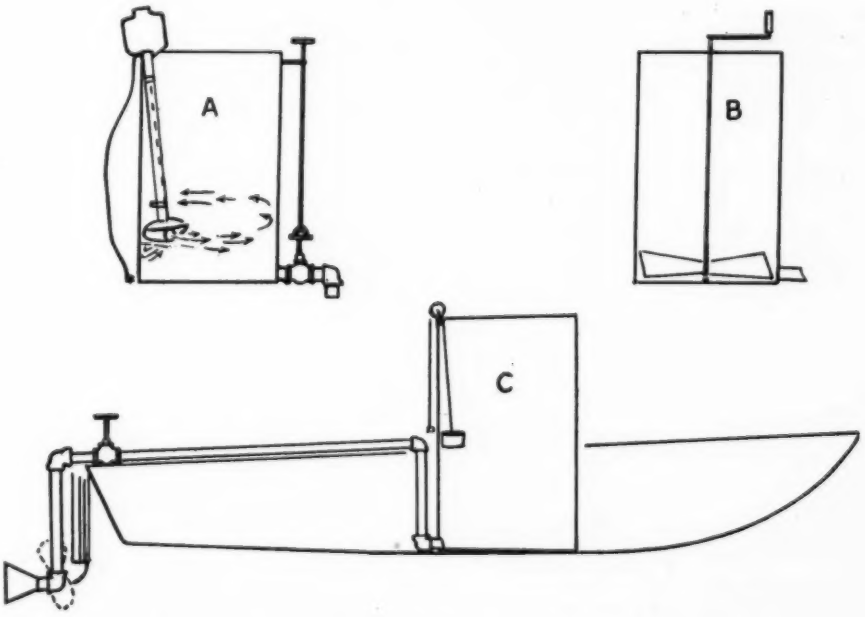
The carbon was applied in a water suspension prepared at the filling station on the land and piped directly to the containers in the outboard motorboats. During the earlier treatments, the carbon was shoveled with scoops into a hand mixer contained in a steel oil barrel, but this method of hand mixing was abandoned in favor of the two-barrel electrical mixing plant shown in the accompanying sketches.

The carbon and water were introduced into the upper barrel which contained an ordinary electrically driven cellar drainer of the centrifugal pump type. The liquid was drawn through the bottom of the pump, mixed with the carbon in the impeller, and released at a good velocity on the periphery of the barrel through the pump discharge opening. A diagonal baffle attached to the side wall of the barrel broke up the rotary motion and prevented the contents of the barrel from rotating without mixing.

The Distributing Boat Taking on Its Load of Carbon Slurry

The second barrel, which contained the hand stirrer, was used to store the carbon slurry until the outboard motorboats were ready to receive it.

A pipe line from the storage barrel, supported on timber frames, carried the suspended carbon to the steel oil barrel container in the outboard motorboats. The distributing barrel in the boat was discharged through a 1-inch copper service pipe, carried up over the stern of the boat and terminating in the wash of the outboard motor propeller. A float indicator was provided to show the operator when the barrel was empty. The rate of discharge was observed as almost constant during the trip, due presumably to the constant vacuum created by the propeller wash.



Carbon Treatment Units of Arrangement Pictured

A—Mixing Tank Equipped with Electric Pump.
B—Slurry Storage Tank with Agitator.
C—Distributing Boat—Slurry Discharge to Propeller.

Time and Expense

Each outboard motorboat distributed 75 lbs. of carbon per 50-gallon barrel. The carbon could be observed in the wake of the boat in a well-distributed strip from 15 to 20 feet wide. Approximately 3 minutes were required to fill the boat's tank and 5 minutes to empty it. The speed of the boat was about 7 miles per hour, and 35 lbs. of carbon were distributed approximately every 1500 feet. The time required to treat 300 million gallons of water with 3000 lbs. of carbon was 10 hours for 4 men at a cost of $40.

Conclusions

Based on more than a year's treatment of Great Sandy Bottom Pond, it is now possible to state that tastes and odors can be successfully combated and removed on a 72-hour notice, and that the carbon will not appear in the distribution system, although no filtration of the water is provided. However, should specks of carbon have appeared at the customers' taps, no serious complaint was anticipated, since it had become generally known that "purifying charcoal" was being added to the reservoir in order to remove the far more objectionable tastes and odors.

John Goetz, Mattoon Sup't., Passes Suddenly

John A. Goetz, Superintendent of Water and Sewage, Mattoon, Ill., died suddenly on April 26 following a very brief illness. Little more than a week before he had been active in the Illinois Section meeting held in Chicago at which time, as Chairman of the Committee, he presented a report on the drafting of legislation to govern the qualifications of water works operators in Illinois.

John Goetz, a native of Waukesha, Wis., had a limited amount of formal education but had acquired a wide knowledge of basic theory and an ability to present his reasoning in a lucid style which made him a welcome contributor to various publications in the field. One of his outstanding professional achievements was his leadership in management of the city water system of Mattoon, which he converted from a backward and confused endeavor, formed by the imperfect fusion of a private "clear" water system and a public industrial (raw surface water) system, into a well coordinated and efficient utility.

As a young man, Mr. Goetz was employed on construction and engineering work in the Milwaukee area, later moving to Arcola, Ill., where he operated as a general contractor. In 1914, he moved to Mattoon where he continued in the general construction and material business until 1933. He was City Engineer of Mattoon for a few years between 1920 and 1930. From 1933 to 1935, Mr. Goetz was superintendent of the city-owned industrial water system of Mattoon, which supplied raw surface water to the industries of that city. In November 1937 he became superintendent of both water systems, the privately owned domestic supply system having been purchased by the city in 1936. And in July 1941 he became superintendent of the Sewer Department and the newly constructed sewage treatment plant as well.

Mr. Goetz was very active in the American Water Works Association, particularly the Illinois Section, and was an active member of the Illinois Water Operators' Association, as well as the Illinois Society of Professional Engineers, and many local organizations.

He is survived by his widow and four sons, all of whom are veterans of World War II.

Correction! ! !

Typographical Errors in Formulas on pages 126, 127, and 129 in April Issue.

In the April issue of Water & Sewage Works there appeared an article by John J. Baffa, Cons. Engr. of New York City. The article was titled "Curve for Determining Flow in Components of Parallel Pipe Systems." Beginning on page 126 and including curves, diagrams and equations, the article was prepared for the purpose of aiding in the calculation of the percentage of total flow for each element of two pipe or multiple pipe parallel systems.

Unfortunately, as the author points out in a letter, nine of the fifteen equations are incorrect in that the exponent was incorrectly set in type. Equations (6), (7), (9), (10), (11), (12), (13), (14), and (15) contain an exponent $(1-n)$, whereas the exponent should be $\frac{1}{n}$.

The author also points out that equation (6) contains another typographical error. Equation (6) should read as follows:

$$P_1 = \frac{1}{1-\left(\frac{r_1}{r_2}\right)^{\frac{1}{n}}}$$

This article, which will be reprinted in the Reference and Data Section of the July 1947 issue, will contain the formulas reproduced correctly.

Frank A. Barbour Dies Suddenly

Frank A. Barbour, Consulting Engineer of Boston, died suddenly on May 24. Born in St. John, New Brunswick, Canada, in 1870, and a graduate of the University of New Brunswick, Mr. Barbour early moved to Boston, where he was employed by the Boston Water Dept.

In 1900 Mr. Barbour entered consulting practice with F. H. Snow and took over the office in 1905 on Mr.

Snow's retirement. Since 1905 Mr. Barbour was actively engaged in the field of water supply and sewage disposal as well as appraisal of water properties.

Mr. Barbour was a member of A.W.W.A., having joined in 1906, and was president of the association in 1935-36. In 1939 he was elected an honorary member. Mr. Barbour was also a member of the New England Water Works Assn., having joined in 1894. He served as president of N.E.W.W.A. in 1921-22 and was elected an honorary member in 1934. Mr. Barbour was also a member of the A.S.C.E., the A.P.H.A., and the A.S.T.M. In the A.W.W.A. he was a member of the Water Works Practice Committee and was active in the development of the Water Works Practice Manual.

Md.-Del. Water and Sewerage Assn. Goes to Washington

Federal Sewage Research Assn. Collaborates

FOLLOWING in the footsteps of "Mr. Smith", the Maryland-Delaware Water and Sewerage Assn. went to Washington for its

Chairmen

Incoming
James W. Engle
U. S. Engrs.
Washington

Outgoing
Clarke Gardner
City Engr.
Salisbury, Md.

20th Annual Conference and the meeting was well attended. Not counting the ladies the total registration was 191 including more than 20 members of the Federal Sewage Research Assn. The meeting was held at the Hamilton Hotel on May 15th and 16th, with a "getogether" on the night of May 14th.

The meeting concluded with scheduled inspection trips to the Dalecarlia Filter Plant, McMillan Filter Plant and Pump Station, Burnt Mills and Laurel Filter Plants, the District of Columbia Sewage Treatment Plant, and the Pentagon Sewage Treatment Plant.

Business Meeting

At the annual business meeting the following officers were elected for the ensuing year:

President
J. W. Engle, U. S. Army Engrs.
Washington, D. C.

1st V. P.
R. C. Willson
Supt. Water
Hagerstown, Md.

2nd V. P.
A. A. Bailey
Filt. Engr.
Baltimore, Md.

First Vice President
R. C. Willson, Supt. of Water
Hagerstown, Md.

2nd Vice President
A. A. Bailey, Filtration Engr.
Baltimore, Md.

Secretary-Treasurer
E. Virginia Gipe
State Dept. of Health
Baltimore, Md.

Executive Committee
Ralph E. Fuhrman (One year)
Supt. Sew. Treat., Washington

A. L. Genter, (Two years)
Cons. Engr., Baltimore

L. C. McClung (Three years)
Dalecarlia Filter Plant, Washington

Kenneth Allen Award
C. E. Keefer
Engineer
Bur. of Sewers
Baltimore, Md.

V. W. Faivre (Four years)
Supt. Filt., Wilmington, Del.

The meeting passed a resolution to create a committee to study the matter of the future of the association if and when a Pennsylvania Section of A.W.W.A. is created and the 4-States Section disbanded.

Kenneth Allen Award

The committee to pick the recipient for the Kenneth Allen Award of the Federation of Sewage Works Assns., chose C. E. Keefer, Engineer, Bureau of Sewers, Baltimore, Md. The citation read as follows:

"The choice of Mr. Keefer is made in recognition of his extensive research and numerous meritorious papers on the treatment of municipal sewage and his work in preparing and publishing one of the outstanding books on the art and science of sewage treatment."

In the welcoming address, **Harold A. Kemp,** Director of Sanitary Engineering, District of Columbia, pointed out that the 20th annual

Host
Harold Kemp
Dir. San. Engr.
Dist. of Columbia

F.S.W.A. Pres.
F. S. Friel
Cons. Engr.
Philadelphia, Pa.

meeting of the association was being held when technical problems were secondary to financial and administrative problems. Of particular importance today is "Where to obtain the money for needed construction." In Washington plans have been made to meet a population increase of 200,000, but with costs up 75 to 80 per cent construction is not feasible.

Mr. Kemp stated that the Potomac River Basin Commission needed money to proceed with its plans. Particularly, the commission needs funds from the Federal government, funds that have been agreed to as the share of the Federal government for the operation of this commission but funds which Congress has never appropriated.

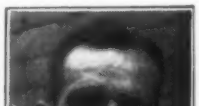
At the business session of the association a resolution was passed calling on Congress to make the necessary appropriation to the Potomac River Basin Commission.

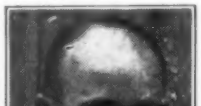
Secy.-Treas.
E. Virginia Gipe
State Dept of Hlth.
Baltimore, Md.

Prog. Chair.
Carl T. Lauter
Supt. Filt.
Washington, D. C.

Improvements at Annapolis and Frederick

President Clarke Gardner presided at the first session and introduced





Executive Committee

One Year	Two Year	Three Year	Four Year
R. F. Fuhrman	*A. L. Genter*	*L. E. McClung*	*Vic Faivre*
Supt. Sew. Tr.	*Cons. Engr.*	*Filter Plant*	*Water Chem.*
Washington, D. C.	*Baltimore, Md.*	*Washington, D. C.*	*Wilmington, Del.*

Roy Ritter, Partner, Whitman, Requardt & Associates, as the first speaker on the technical program. Mr. Ritter told of "Improvements in Water Supply and Sewage Treatment at Annapolis and Frederick, Md." These communities have populations of 14,000 and 18,000 respectively. Annapolis, which showed a 60 per cent increase in demand during the war, has had little drop in consumption since the war. While the filter capacity is ample, the general supply system which originated 82 years ago is too small. The source of supply is too small, the coagulating basin capacity is too small, and the transmission mains are too small.

Remedies for this situation include two new wells, cleaning and lining mains, and adding new mixing, coagulating, and settling basins.

At Frederick, Md., there is inadequate source, inadequate treatment facilities, inadequate distribution system, and no elevated storage. Frederick has shown a 60 per cent increase in consumption in 15 years and no decrease since the war.

Remedies include an elevated storage to balance draft and pressure and a tie-in with the Camp Detrich supply with improved treatment plant facilities and a 12-in. main loop to improve distribution.

Annapolis now has ample primary sewage treatment and plans are made to install high rate trickling filters. Frederick dewaters raw sludge and burns it in an incinerator.

Cross Connections

Messrs. **W. H. Cary,** Director, and **A. P. Bell,** Pub. Health Engr., Bureau of Pub. Health Engineering of the District of Columbia Health Department, presented "A Program for the Elimination of Cross Connections and Plumbing Defects" as developed for the District of Columbia.

The program was accelerated by the 1942 Drinking Water Standards and included surveys of hotels, apartment houses, dairies, industries, etc. Detailed inspections were made of each location and maps of piping diagrams were prepared. The success of the program resulted from cooperation with industry and management. Problems of ground water used for cooling were among those encountered.

Mr. Bell, who read the paper, said that laboratory facilities were definitely needed for testing cross-connection protection devices. The paper was discussed by Mr. Schultz of the Baltimore Health Dept., who cited several examples of illness from cross connections and told of the program in Baltimore.

Chlorination for Manganese Control

The Wilmington Suburban Water Co. of Wilmington, Del., was confronted with the problem of manganese in the water supply, and according to **Victor Faivre,** Supt. of Filtration, the use of the breakpoint process of chlorination was the answer. It was not less expensive than liming but more effective and reduced the manganese content from 1.5 ppm. to less than 0.05 ppm. No chlorine tastes were observed, although the chlorine dosage was 2.9 to 3.4 ppm. and the free residual chlorine content was from 0.5 to 0.9 ppm.

Edw. S. Hopkins, Supt. of Filtration at Baltimore, where this treatment has also been successfully used, pointed out that Mr. Faivre's work showed that it was not necessary to have expensive equipment to do the job and that a small plant could employ the treatment just as well as a large plant.

Institutional Sewage

Graham Walton, Sanitary Engineer, Federal Bureau of Prisons, told of the high flows (150 to 350 gcd.) found in Institutional Sewage Treatment. The B.O.D. of the sewage averages 0.19 lb. per cap. per day, and the susp. sol. content is 0.23 lb. per cap. per day, both higher than domestic sewage but about the same as army camps.

Mr. Walton hopes for better sampling and analysis to aid in operation and design of this type of plant and he suggests that for institutions of this type the following should be borne in mind:

1. Use only one plant for all wastes.
2. Give special thought to industrial wastes as these often exist.
3. Proper location.
4. Flow and B.O.D.—Note 35 per cent of flow and 60 per cent of B.O.D. occurs in four hours.
5. Use processes that will take shock loads.
6. Only inmate help is available.
7. Avoid mechanical equipment.
8. Heavy rag load at time of "shake-downs."
9. Use sand filters for polishing.
10. Emphasize safety.

Programmers

Wm. H. Cary	*A. P. Bell*	*W. Y. Irwin*	*P. D. McNamee*
Director	*Pub. H. Engr.*	*Devel. Engr.*	*Chemist*
Bur. P. H. Engr.	*Bur. P. H. Engr.*	*Congoleum-Nairn*	*Sew. Tr. Plant*
Washington, D. C.	*Washington, D. C.*	*Cedarhurst, Md.*	*Washington, D. C.*

Sanitary Land Fills

Sanitary land fills for garbage disposal have been eminently satisfactory at Baltimore, according to **George H. Elliott, Jr.,** Assoc. San. Engr., Bureau of Mechanical Electrical Service, Baltimore, Md. In an area of 23 acres the cell method is used with two cells having a 15 ft. width being used at a time. One secret of the success of the method is to complete each cell each day and leave no exposed garbage at the day's end. Another secret is to compact the material well by the weight of machines working over it and to cover it with at least 2 ft. of earth. No flies, odors, or rats are observed at the dump.

Future Chlorine Supply

Messrs. **C. M. Holt,** Mgr. of Chlorine Sales, and **L. R. McCoy,** Sales Engr. of Diamond Alkali Works, explained the present situation with respect to chlorine. Reasons for the current shortage since mid-1944 are:

1. Each user wants more now than in 1940.
2. The expanding plastics industry requires more chlorine.
3. Insecticides and weedicides require chlorine.
4. Research development uses considerable chlorine.

The Diamond Alkali Works, Inc., has leased the Chemical Warfare Service Plants and within another year will have this 300 ton per day additional capacity to help ease the shortage. Other companies are building plants but much of the building is for captive uses.

Chlorine containers are still short and empties should be returned promptly. Mr. Holt said not to expect a surplus of chlorine for 10 years unless there is a major recession, and don't expect relief from the current shortage until 1949-50.

Rockville, Md. Water Emergency

L. Tarbett
Pub. H. Engr.
Montgomery Co. Health Dept.

D. A. Wood
Engr.
Wood & Preuit
Washington, D. C.

(Both Second Generation Water Men)

Mr. Holt also expressed some ideas of a chlorine manufacturer about the water and sewage business. Chlorine companies are interested in this field because they expect the use of chlorine to grow; it is a depression proof business and presents no collection problems. On the other hand, municipalities demand stable bids in the face of rising prices and if this practice continues the cities may lose the chlorine to competitive industrial uses. Another "gripe" of the chlorine manufacturer is the rotation of business. These ideas expressed were those of the authors' who were speaking as representatives of their own company and not for the industry as a whole.

Linoleum Wastes

W. Y. Irwin of the Development Dept. of Congoleum-Nairn, Inc., Cedarhurst, Md., told of the source of the wastes from linoleum products. By means of save-alls, recir-

Dr. Chas. E. Renn, Prof. San. Chem., Johns Hopkins Univ., Baltimore, and

F. W. Kittrell, Sanitary Engineer, Tennessee Valley Authority, Knoxville, Tenn.

culation of water, bottling up, and so forth the amount of water wasted was reduced from 100 to 200 tons per ton of felt to 5 tons per ton of felt.

As the water is reused during a weekly operation, the concentration goes from 800 to 3900 ppm. of B.O.D. in the concentrated liquor. Pilot plant experiments with high rate trickling filters using 2½ in. stones produced effective treatment. Using 3 mgad. or 300 lb. of B.O.D. per acre per day, the waste was reduced from 150 to 50 ppm. B.O.D. in a single stage. Two stage gave 90 per cent reduction.

For a full scale plant three lagoons will be used in a 3-week cycle (one week to fill, one week to stand, and one week to empty). This waste when applied to the filter using a 5/6 return of the secondary effluent to the primary filter with 1/6 chlorinated and discharged will reduce the waste load to 5 to 9 per cent of the original.

The Growing Federation

The Federation of Sew. Wks. Assns. was represented at the meeting by both the president and vice

Programmers

Roy Ritter
Partner
Whitman, Requardt Engrs., Balti.

C. M. Holt
Manager
Chlorine Sales
Diamond Alkali

president, **F. S. Friel,** Cons. Engr. of Philadelphia, and **George S. Russell,** Cons. Engr. of St. Louis. Mr. Friel spoke on "The Growing Federation" and pointed out that it is growing not alone in members (expected to be 4,000 by July) and in member associations (two new ones this year), but the Federation is growing in its service to its members.

Two manuals issued, many more in preparation, plans for a monthly journal, a technical and advisory service from the Exec. Secretary's office, are among the growing services. Mr. Friel emphasized the need for the Federation to provide a division for industrial waste within the Federation in order to attract persons working in that field. Friel pointed out two trends, one positive and one negative, that indicate that need: First, the inclusion of the words "Industrial Wastes" in the name of the two most recent sewage works associations formed—the Ky.-Tenn. and the Virginia Industrial Wastes and Sewage Works Assns. (Pennsylvania is considering adopting a similar name); secondly, (negative) the trend of many other organizations of engineers, chemists, etc., to hold industrial waste symposiums.

Sewage Disposal for Housing Projects

R. Vanderwerker, Sr., San. Engr., Federal Housing Administration, reviewed the three periods of housing projects (Prewar, Wartime, and Postwar). The first was generally local in nature, the second had standards for sewage disposal, but these often could not be met, and the third likewise has its standards.

Mr. Vanderwerker said that of wartime projects, many had sewage treatment plants (19 with complete

treatment, 39 with partial treatment), and chlorination of the effluent was practiced in 45 of these plants. Projects served as few as 160 and as many as 11,000 persons. Package plants gave satisfactory operation. Among the many problems none was worse than in plants where Imhoff tanks were constructed of wood. Septic tanks needed cleaning at frequent intervals to prevent loss of capacity as they were often overloaded.

Sludge Digester Troubles

At the Blue Plains Sewage Treatment Plant for Washington, D. C., one of the most persistent problems is that of scum in the sludge digesters. According to **Paul D. McNamee,** this problem is aggravated by the fact that the population tributary has increased from 650,000 to 1,000,000 and the digesters are grossly overloaded. The load has reached 1.5 lb. of vol. matter per cu. ft. per month, and without agitation the whole sludge blanket floats. Recirculation on a small scale caused the scum to swell. Until there is ample digester capacity, continuing troubles are expected.

This problem of scum control in digesters was discussed by representatives of three equipment manufacturers: Messrs. **W. A. Darby** of the Dorr Co., **Jos. J. Gilbert** of the Link Belt Co., and **Paul Cerny** of the Pacific Flush Tank Co. Each of these speakers commented on the solution of scum problems as it may be brought about by equipment produced by these respective companies.

J. J. Gilbert
Link-Belt Co.
Philadelphia, Pa.

W. A. Darby
Dorr Co.
New York City

Paul Cerny
Pac. Flush Tank
New York City

Edw. S. Hopkins
Supt. Filt.
Baltimore, Md.

Discussors of Papers

A Water Emergency

Rockville, Md., had a water emergency last year. The well supplies failed to yield sufficient water for the municipality's needs. What was done to alleviate the condition was told by **L. Tarbett,** Pub. Health Engr., Montgomery County Health Dept., and commented on by **D. A. Wood,** of the firm of Wood and Preuit, Equipment Engineers.

The first step was to issue boiling orders for all water used, some raw water from a creek being pumped into the system. These orders were broadcast by telephone operators and loud speakers on trucks.

Next through the help of the Red Cross a U. S. Army Mobile Water Purification Unit was dispatched to the scene and a water point set up at the creek. This water was treated with alum and filtered through diatomite filters, chlorinated to 3 ppm. residual, and pumped to the water system through a fire hydrant. This Army system delivered 750,000 gallons in the week or so elapsing before new well equipment was installed.

Mr. Tarbett voiced the opinion that diatomite filters were okeh where the turbidity is less than 5 ppm., but that efficiency of filtration drops off markedly where turbidity is present.

Both Mr. Tarbett and Mr. Wood emphasized the fact that had adequate records been kept of well operation, this emergency could have been foreseen and steps taken to obviate the difficulties before they happened.

Guardia Heads Panama & Colon Water & Sewer Systems

Carlos A. Guardia, sanitary engineer with the firm of Arango and Lyons, S.A. in Panama has been named Chief Engineer of the Panama and Colon water and sewer systems, according to an announcement by Enrique A. Jimenez, President of the Republic of Panama.

Sr. Guardia who was educated in the United States after which, on the recommendation of the Rockefeller Foundation, he served as Sanitary Technician in the Republic of Venezuela for five years. He then served as a sanitary engineer in the Republic of Panama for five years. Last year he resigned his government job to join the engineering firm of Arango and Lyons, and was later appointed as a member of a committee to discuss terms of transfer to the Republic of Panama of the Panama-Colon water works with the Governor of the Canal Zone, J. C. Mehaffey, and Col. Halle. This plan to transfer the utilities from the United States to the Republic is in accordance with a management contract signed last year between the two countries.*

Sr. Guardia is one of the valued collaborators in the translation and publication of the *Manuel de Ingenieria Sanitaria* first issued by the Gillette Publishing Co. in 1946.

*Ed. Note: The water and sewer systems of the cities of Panama and Colon at the Pacific and Atlantic ends of the canal were designed and built during construction of the canal by U. S. engineers (with U. S. funds) in the interest of public health, although neither of these cities are in the Panama Canal Zone, which is wholly under the U. S. Government. These systems are valued at $15,000,000 and produce an annual income of approximately $1,500,000. The Republic of Panama is fortunate to be able to take over these valuable facilities on highly favorable terms.

Is Our Face Red?

Correction on a Correction

On advertising page 79 of the January 1947 issue we ran a correction to the Specific Speed formula as that formula had appeared in an article by Professor Robert Angus.

(Incidentally that article will appear in the Reference & Data Issue with the correct formula.

In that correction we stated that we were indebted to a reader in Australia for the correction.

Now comes a letter from that reader saying "Your correction now requires a further correction. New Zealand is not in Australia!" The reader who sent in this correction is Mr. F. Malcolm Corkill (we hope we have the spelling correct), City Engineer of Invercargill, New Zealand —Is our face red?

N. Y. UNIVERSITY HONORS THE LATE PROFESSOR CARPENTER

Sanitary Engineering Laboratory and Experimental Station Named the Lewis Van Carpenter Laboratory

AT DEDICATION ceremonies held May 13 at New York University, the late Professor Lewis Van Carpenter, who passed away while serving on the university's College of Engineering faculty, was honored when a unique sanitary engineering laboratory which he helped to build was named in his honor.

That laboratory, the only one of its kind, can handle 100,000 gallons of sewage a day and reproduce actual conditions for carrying on chemical and biological research, and water filtration problems can be studied in a 25,000 gpd. rapid sand filter. Built by the City of New York a decade ago on a corner of the campus deeded by the University, studies conducted there have been exceptionally important to the field of sanitary engineering.

Mrs. Tempie Carpenter Van Doren, widow of the professor who died in 1940, three years after completion of the laboratory, unveiled a bronze plaque on the facade of the building, designating it the "Lewis Van Carpenter Sanitary Engineering Research Laboratory." Dean Thorndike Saville of the College of Engineering, who preceded Prof. Carpenter as chairman of the College's department of sanitary engineering, paid tribute to his work. Professor Rolf Eliassen, present chairman of the department, described recent studies which have been carried on in the laboratory.

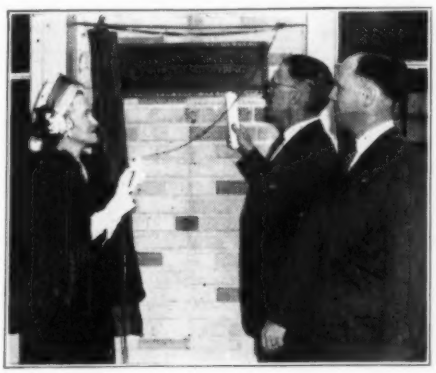
In the course of his tribute to Professor Carpenter, Dean Saville read an editorial which appeared in *Water Works and Sewerage* at the time of Prof. Carpenter's untimely passing. That editorial, written by a close friend, Linn Enslow, editor of this magazine, read in part: "His name stood for all that it signifies—*the builder*. . . . His second name, Van, signifies being out in front. And that is where he found himself with a singular ability for staying there. What his first name, Lewis, stands for we are not certain, but we will interpret it as signifying a pioneering spirit, fearlessness, and leadership—for all three of these qualities he possessed. With it all, if he were asked to select a single phrase for his epitaph, we feel sure that it would be *'The Teacher.'* And, like many another, we shall always remember Lewis Carpenter as that."

Lewis Van Carpenter
1895-1940

Among those present at the ceremonies were Irving V. A. Huie, president of the New York City Board of Water Commissioners; Seth G. Hess, chief engineer of the Interstate Sanitation Commission; Dr. Sol Pincus, Deputy Commissioner of Health, New York City; R. H. Gould, director of the Division of Engineering of the Department of Public Works; and Malcolm Pirnie, a past president of the American Society of Civil Engineers.

Two members of the governing Council of the University also witnessed the unveiling. They were Arthur Tuttle, a past president of the A. S. C. E., and W. W. Brush, editor of *Water Works Engineering.*

Others attending included the Deputy Commissioner of Public Works, Homer R. Seely; Joseph W. Zengerle, of the Department of Sanitation; Dr. George E. Symons, associate editor of *Water & Sewage Works;* Edward J. Cleary, managing editor of *Engineering News Record,* and W. A. Hardenbergh, editor of *Public Works.*



The Dedication Ceremony Completed
Mrs. Tempie Carpenter Van Doren unveils plaque honoring her late husband. With her are Dean Thorndike Saville and Prof. Rolf Eliassen of N.Y.U.'s College of Engineering

Professor Carpenter was active for many years in the N. Y. State Sew. Wks. Assn. and had instituted many "short schools" for municipal plant operators in sanitary engineering and allied fields.

While the Laboratory is operated by the College of Engineering, priority is given to research projects desired by the City Departments of Sanitation and Public Works. Research projects have also been conducted for the American Water Works Association, Wright Aeronautical Corporation, Wallace and Tiernan Co., Link-Belt Co., Ozone Processes, Inc., Cloroben Corp., and other corporations.

The largest project was begun under Professor Carpenter's supervision for the New York City Department of Sanitation. It was a study of the characteristics and phenomena of sanitary landfills.

Professor Carpenter was one of the leading sanitary engineers in the nation when he died in 1940 at the age of 45 years. Before he entered the field of education he was active in commercial and municipal engineering. Among the positions he held were County Road Engineer in West Virginia, Construction Superintendent of the same state, and Field Engineer for the National Exploration Corporation in Wyoming. He was a veteran of the World War.

He was a regular contributor to this magazine and the author of many articles published in other technical and professional journals, including "Use of Activated Carbon in Water Treatment," "Effect of Manganese on Filter Operation," "Chloramine Treatment of Sea Water," and a series of articles dealing with the use of sulphur compounds in the treatment of water and industrial wastes. He also was editor of the first edition of the AWWA "Manual of Water Quality," which was published after his death and fittingly dedicated to his memory.

Comments of the Editors

The Industrial Waste Problem—and, the Sewage Works Federation

In this issue is a well worth reading article by L. L. Hedgepeth, which discusses the industrial pollution problem in a very practical and down-to-earth fashion. The author, one-time employee of a State Health Dept., and a former water plant operator, until his recent selection to direct the work of stream pollution control for Virginia's new State Water Control Board was connected with industry for a number of years as Director of Technical Services, and is particularly well grounded for his new duties. From the reasoning and the thoughts expressed in his paper, "Industrial Usage of Streams," Mr. Hedgepeth is considering the very practical problem of securing industrial pollution abatement in a very practical and carefully analytical manner of the experienced observer and well grounded technician that he is. Further than that, he reasons out this matter of securing a pollution clean-up by industry as hinging on the often forgotten rule of fair dealing, "Do unto others as you would that others do unto you."

The new Virginia Water Control Law of 1946 appeals to this writer as a carefully and thoughtfully drawn law. It appears to be sufficiently reasonable and flexible to render it a practical law which *can* be enforced. It has the great value of not alarming industry, which under most of the older pollution laws preferred to pay fines imposed for polluting rather than attempt to meet the wholly unrealistic requirements of these earlier laws. The Virginia Act was developed to a major degree by Richard Messer, veteran Chief Engineer of the Virginia State Dept. of Health, whose primary objective was that of securing a practical and workable law with good prospects of survival, rather than a law with so-called "teeth" which might lack practicability and suffer non-enforcibility and subsequent death.

An example of the practicability of the Virginia Act is found in its tolerance toward existing pollution from long established industry, but it contains the immediate requirement that there shall be no "new pollution" without a permit, all such permits being based on local conditions and subject to curtailment or revocation upon reasonable notice, where circumstances warrant. The term "new pollution" does not mean that an existing plant is prohibited from plant extensions to increase production, and, incidentally, the local payroll. "New pollution" in the case of existing plants means *additional* pollution. This, then, means that if the management of an existing plant wishes to double its size it can do so. It is only necessary for the management to perfect internal methods of reducing waste, or treatment of such wastes, or a combination of both, which will result in a reduction of the pollution index of its wastes by 50 per cent in terms of volume, strength, or both. If, in other words, a plant is doubled in size but turns into the stream wastes with an *overall* pollution index one-half that of its wastes before plant enlargement, this plant is unquestionably not contributing "new" (additional) pollution, inasmuch as $1 \times 1 = 1$ and $2 \times 0.5 = 1$ also, and the *overall* pollution is still 1.

In his evaluation of "Waste Disposal Regulation Objectives," Mr. Hedgepeth comes right to the point when he states that although pollution abatement programs require cooperative regulation and attack of problems backed by sound law, legislative acts should only be considered as providing "a necessary skeleton work of strong supporting girders" on which appropriate regulation can be constructed to meet requirements of the time. But, he added, just as important is the realization that such regulations must be so constructed as to stand up and weather the "storms" which will come with certainty just as soon as industrial competition once again becomes keen and profits less profuse than at present.

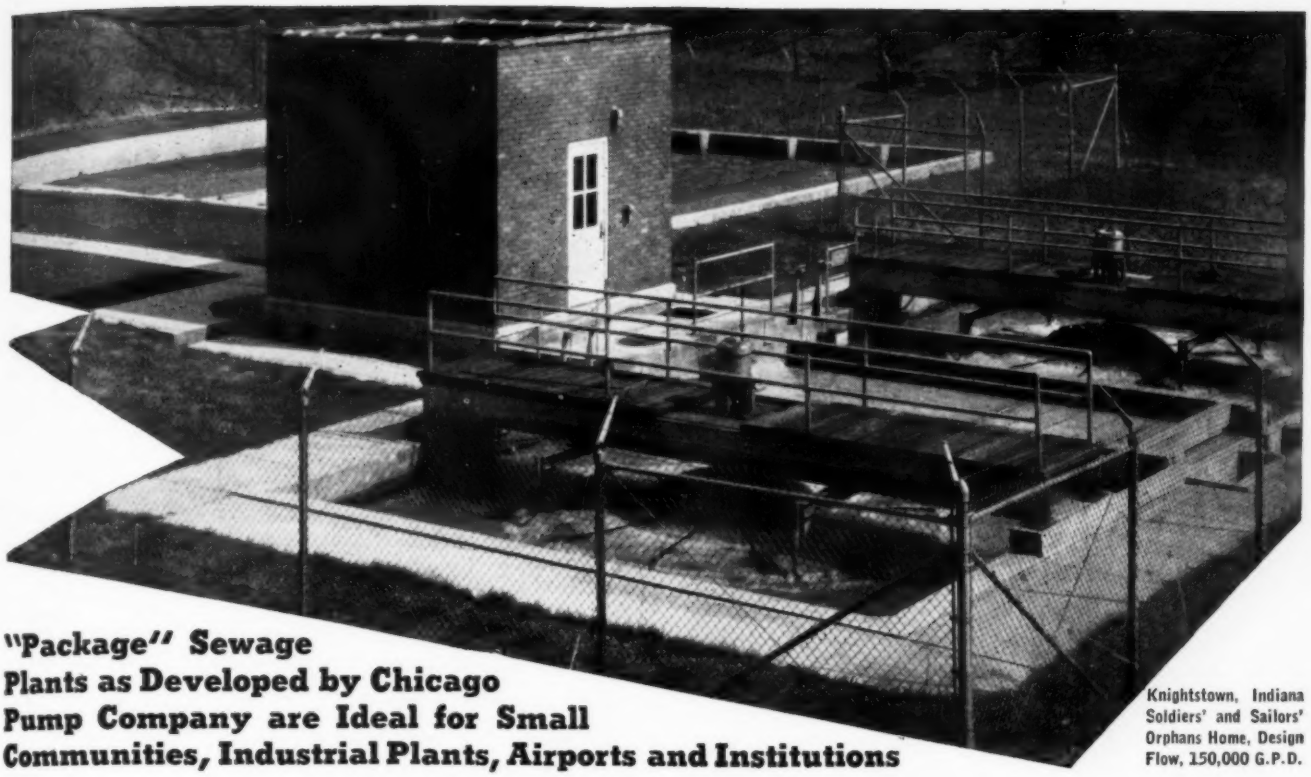
That Mr. Hedgepeth is off to a good start in his important assignment was in evidence when the Virginia Industrial Waste and Sewage Works Assn. at its organizational meeting, attended by a large number of industrialists, elected him by unanimous vote to the office of National Director on the Board of the Sewage Works Federation. Thus, he becomes the spokesman for the Virginia Association in matters of policy as well as practice.

We have just received an invitation to attend the organization meeting of the West Virginia Industrial Waste and Sewage Works Assn. this month. It is the third of these new combination industrial waste and sewage associations to be organized within the year and others are planned. Like the Virginia group, the Ky.-Tenn. Sewage and Industrial Wastes Assn. also chose as its representative on the Sewage Works Federation's Board an industrial waste man—Jim Ellis, Supt. of Tenn.-Eastman's important Kingsport, Tenn., plant.

These comments bring to mind the fact that the Michigan Sewage Works Assn. devoted a full day of its recent annual meeting to industrial wastes, with the result that there was recorded the largest registration in the history of the Association, at least 80 in attendance having been drawn by the industrial wastes program.

This leads us to repeat a question previously raised on this page: Isn't it now timely for the Sewage Works Federation to establish an "Industrial Waste Division" and thereby make it attractive for the industrial waste group to become members of the Federation, rather than develop a new organization of their own or become affiliated with the Am. Chemical Society or the Am. Institute of Chemical Engineers. It is our opinion, with some foundation, that the Federation and the industrial waste group will mutually benefit from the suggested affiliation. Those who comprise the membership of the Federation together with the industrial waste men have so much in common (more as time goes on), that it would be a shame to see any other alliance develop. Regardless of the attitude of the Federation Board, the member associations will be featuring programs dealing with industrial waste treatment. It would, therefore, be none other than consistent, as well as being smart, for the Federation Board to take prompt decisive action in establishing a special Industrial Waste Division within the Federation.

L. H. Enslow



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They require a minimum of operating supervision, produce a sparkling clear effluent, are free from flies, foul odors and unsightly appearance. Can be located near dwellings.

Initial cost of "Package" plants is low and they are inexpensive to operate.

Local Operators without previous sewage treatment experience successfully operate these plants. Former farmers, salesmen, coal-miners, truck-drivers are operating existing plants and performing other municipal duties.

Operator training service by Chicago Operating Sanitary Engineers is provided with each plant. Ingenious automatic features of Chicago "Package" plants simplify operation and assure successful performance.

Aeration and clarification are performed in a single tank with positive, automatic sludge control. One sludge setting covers a wide range of sewage flows and strengths.

Since 1934 over 100 plants have been installed and are successfully operating.

Properly designed, these units can handle industrial, cannery and other wastes as well as the usual community sewage.

The "Package" plant was specifically developed for small populations and can be engineered to meet requirements. Complete literature available.

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SEWAGE EQUIPMENT DIVISION

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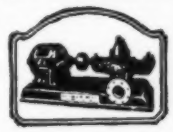

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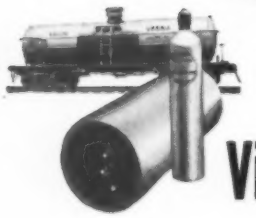

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MEETINGS SCHEDULED

June 12-14—UNIVERSITY, ALA. (University of Alabama)
Alabama Water & Sewage Association. Alex O. Taylor, Director of Eng. Extension Service, Ala. Polytechnic Institute, Auburn, Ala.

June 18-20—BATON ROUGE, LA. (Louisiana State University)
Tenth Annual Water & Sewage Short Course. Director, John H. O'Neill, Dept. Public Health, P. O. Box 630, New Orleans 7, La.

June 19—BOONTON, N. J.
N. J. Section A.W.W.A. Outing. Sec'y, C. B. Tygert, Box 178, Newark, N. J.

June 20-21—DULUTH, MINN. (Spalding Hotel)
Central States Sewage Works Assn. Sec'y, P. W. Reed, 1098 W. Michigan Ave., Indianapolis, Ind.

July 21-25—SAN FRANCISCO, CALIF. (Auditorium)
American Water Works Association 1947 Conference. Executive-Secretary, Harry E. Jordan, 500 Fifth Ave., New York 18, N. Y.

July 22-24—SAN FRANCISCO, CALIF. (Auditorium)
Federation of Sewage Works Associations. (20th Annual Meeting.) Executive-Secretary, W. H. Wisely, 325 Illinois Bldg., Champaign, Ill.

(Meetings and Exhibits in the Auditorium.) Application blanks for hotel accommodations may be obtained from the respective Association Headquarters.

Aug. 13—CARIBOU, ME.
Maine Water Utilities Assn. Sec'y, Earle A. Tarr, Winthrop, Me.

Aug. 25-27—STATE COLLEGE, PA. (Nittany Lion Inn)
Pennsylvania Sewage Works Assn. Sec'y-Treas., Bernard S. Bush, Kirby Health Center, Wilkes-Barre, Pa.

Aug. 27-29—STATE COLLEGE, PA. (Nittany Lion Inn)
Pennsylvania Water Works Operators' Assn. Sec'y, I. M. Glace, 1001 Front Street, Harrisburg, Pa.

Sept. 16-19—BOSTON, MASS. (Statler Hotel)
New England Water Works Assn. Sec'y, Jos. C. Knox, 609 Statler Bldg., Boston, Mass.

Sept. 17-19—ATLANTA, GA. (Ga. School of Technology)
Annual Water & Sewage School. Sec'y, Van P. Enloe, Rt. 5, Box 363, Atlanta, Ga.

Sept. 18-20—BAY CITY, MICH.
Michigan Section A.W.W.A. Sec'y, R. J. Faust, State Dept. of Health, Lansing, Mich.

Sept. 22-24—LOUISVILLE, KY. (Brown Hotel)
Kentucky-Tennessee Section A.W.W.A. Sec'y, R. P. Farrell, 420 6th Ave., N., Nashville 3, Tenn.

Sept. 30-Oct. 1—COLUMBUS, OHIO (Deshler-Wallick Hotel)
Ohio Section A.W.W.A. Sec'y-Treas., F. P. Fischer, 812 Perry Payne Bldg., Cleveland, Ohio.

Oct. 2-3—COLUMBUS, OHIO (Deshler-Wallick Hotel)
Ohio Conference on Sewage Treatment. Sec'y-Treas., L. B. Barnes, 441 S. Prospect St., Bowling Green, Ohio.

Oct. 2-3—BLUEFIELD, W. VA. (Hotel West Virginian)
West Virginia Section A.W.W.A. Sec'y, J. B. Harrington. State Department of Health, Charleston, W. Va.

MEETINGS SCHEDULED

Oct. 6-8—NIAGARA FALLS, ONTARIO (General Brock Hotel)
Canadian Institute on Sewage & Sanitation. Sec'y-Treas., A. E. Berry, Ontario Department of Health, Toronto 8, Ont.

Oct. 6-10—ATLANTIC CITY, N. J. (Convention Hall)
American Public Health Association. (75th Annual Meeting.) Exec.-Sec'y., Reginald M. Atwater, M. D., 1790 Broadway, New York, N. Y.

Oct. 8—DOVER-FOXCROFT, ME.
Maine Water Utilities Assn. Sec'y, Earle A. Tarr, Winthrop, Me.

Oct. 9-11—CEDAR RAPIDS, IOWA (Hotel Montrose)
Iowa Section A.W.W.A. Sec'y-Treas., H. V. Pedersen, Municipal Bldg., Marshalltown, Iowa.
(Joint meeting with)
Iowa Sewage Works Assn. Sec'y-Treas., Robert D. Mott, Iowa City, Iowa.

Oct. 13-15—AMARILLO, TEXAS (Hotel Herring)
Southwest Section A.W.W.A. Sec'y-Treas., L. A. Jackson, Robinson Memorial Auditorium, Little Rock, Ark.

Oct. 16-17—OCEAN VIEW, VA. (Hotel Nansemond)
Virginia Industrial Wastes & Sewage Works Assn. (First Annual Conference). Sec'y-Treas., A. H. Paessler, 815 E. Franklin St., Richmond 19, Va.

Nov. 3-5—ATLANTA, GA. (Biltmore Hotel)
Southeastern Section A.W.W.A. Sec'y, W. T. Linton, State Board of Health, Wade Hampton Office Bldg., Columbus, S. C.

Nov. 6-8—ATLANTIC CITY, N. J. (Hotel Claridge)
New Jersey Section A.W.W.A. Sec'y-Treas., C. B. Tygert, Box 178, Newark, N. J.
(Joint meeting with)
South Jersey Assn. Water Supts. Sec'y, Walter Spencer, 2707 Bethel Ave., Merchantville, N. J.

Nov. 10-12—GREENSBORO, N. C. (Sedgfield Inn)
North Carolina Sewage Works Association. Sec'y-Treas., Geo. S. Moore, P.O. Box 125, Albemarle, N. C.

Nov. 12-14—PITTSBURGH, PA. (Hotel Wm. Penn)
Engineers' Society of Western Penna. (8th Annual Conference) Gen. Chairman, H. M. Olson, Wm. Penn Hotel, Pittsburgh, Pa.

Nov. 17-18—ROANOKE, VA. (Hotel not selected)
Virginia Section A.W.W.A. Sec'y-Treas., W. H. Shewbridge, 708 State Office Bldg., Richmond, Va.

Nov. 19-21—WASHINGTON, D. C. (Hotel not selected)
Four States Section A.W.W.A. Sec'y-Treas., W. A. Welch, 748 Public Ledger Bldg., Philadelphia, Pa.

Nov. 20—BOSTON, MASS. (Statler Hotel)
New England Water Works Assn. Sec'y, Jos. C. Knox, 609 Statler Bldg., Boston, Mass.

Dec. 10—WINTHROP, ME.
Maine Water Utilities. Sec'y, Earle A. Tarr, Winthrop, Me.

Dec. 18—BOSTON, MASS. (Statler Hotel)
New England Water Works Assn. Sec'y, Jos. C. Knox, 609 Statler Bldg., Boston, Mass.

50th Anniversary - 1897 - 1947

ROTARY

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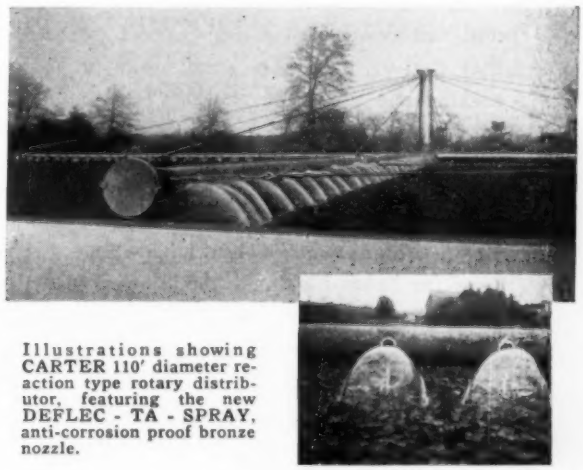
WRITE FOR BULLETIN NO. 4401



Illustrations showing CARTER 110' diameter reaction type rotary distributor, featuring the new DEFLEC - TA - SPRAY, anti-corrosion proof bronze nozzle.

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If your design problem demands a high removal of B.O.D. and suspended solids; stabilized efficiencies during severe temperatures, plus practical control of the filter fly problem, we suggest you investigate the CARTER reaction type rotary distributor mechanism. Complete information on our unit, with details of the new leveling flange, which permits column alignment without disassembly of arms are described in our Bulletin 4401.

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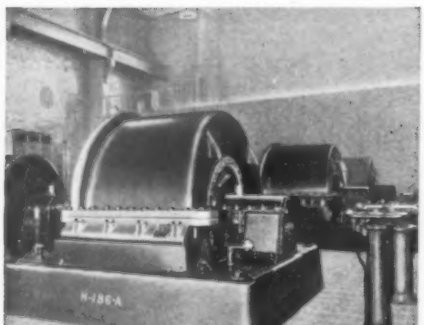

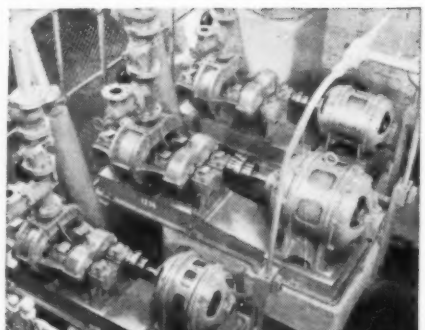

The wide use of Roots-Connersville Blowers, in sewage plants and waterworks, provides "expert evidence" of the satisfaction they deliver. Whether small units or large ones, engineers are enthusiastic about the reliable, economical performance of R-C equipment.

They like, especially, the unbiased recommendations which come from our *dual-ability* to supply either Centrifugal or Rotary Positive equipment. They tell us that this independent thinking goes far toward making the blowers exactly fit the specific job to be done.

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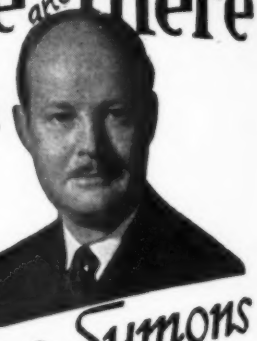


H.T.M.A. And this is the month of surprises. Believe it or not this is the month of special announcements, including that one I've been promising you since last December. —So stick around for a few paragraphs.

* * *

Positively, It Stinks! — That's what Wendell La Due, A.W.W.A. President, said one time—Positively, It Stinks. You wouldn't think that was good Public Relations, would you? But it was!

It was at an Akron luncheon club meeting. Hoping to embarrass Wendell, one of the members addressed the chair and said, "I'd like to know, Mr. Chairman, what is the matter with the water in this city?"

Mr. La Due stood up, said, "Positively, It Stinks," and sat down to a roar of laughter. That evening the local newspaper carried an editorial headed—you guessed it—"Positively, It Stinks!" Then the paper proceeded to congratulate Mr. La Due, not only for his forthrightness, but also for his ability as a water works manager. The paper went on to explain the causes of tastes and odors (they were having algae troubles at the time), what was being done and about how long the trouble would last.

When you want a lesson in Public Relations, that Wendell La Due is a past master.

* * *

Special Announcement!—Doc Symons does it again!—You may recall that when the 9th Edition of Standard Methods for Water and Sewage Analysis came off the presses last winter (incidentally the second printing will be available this month)—as I say, you may recall that I got the first copy off the presses.—Well, herewith is another first.

This is the first button printed with the new Pee Bees insignia. Look for it at conventions—You won't see

it on my lapel because I haven't qualified yet, but if you like to play bridge just speak to a wearer of one of these buttons.

* * *

From the Newkirk Clipping Service (Sam II, That Is) "Washington, D. C., March 18 (AP).—Geological Bulletin 920 has been withdrawn and destroyed, but a few contraband copies circulated among giggling government employees today. Bulletin 920 was to have been a serious water supply study of the Sevier Basin in Utah (but an error in the print shop bindery occurred with this result)—A dissertation on Utah water levels was followed by a chapter on feeding of infants, with illustrations."

* * *

At the Illinois Sect. A.W.W.A. meeting in Chicago last April, a Professor Burton of Notre Dame was talking on Atomic Power and the persons taking notes most furiously were not Doc Symons and his competitors but Tom (A.W.W.A. Vice Pres.) Veatch and Jess Woltman, two consulting engineers who were obviously laying the foundation for coming out with a new method of sewage treatment by atomic disintegration. Watch for it any day now.

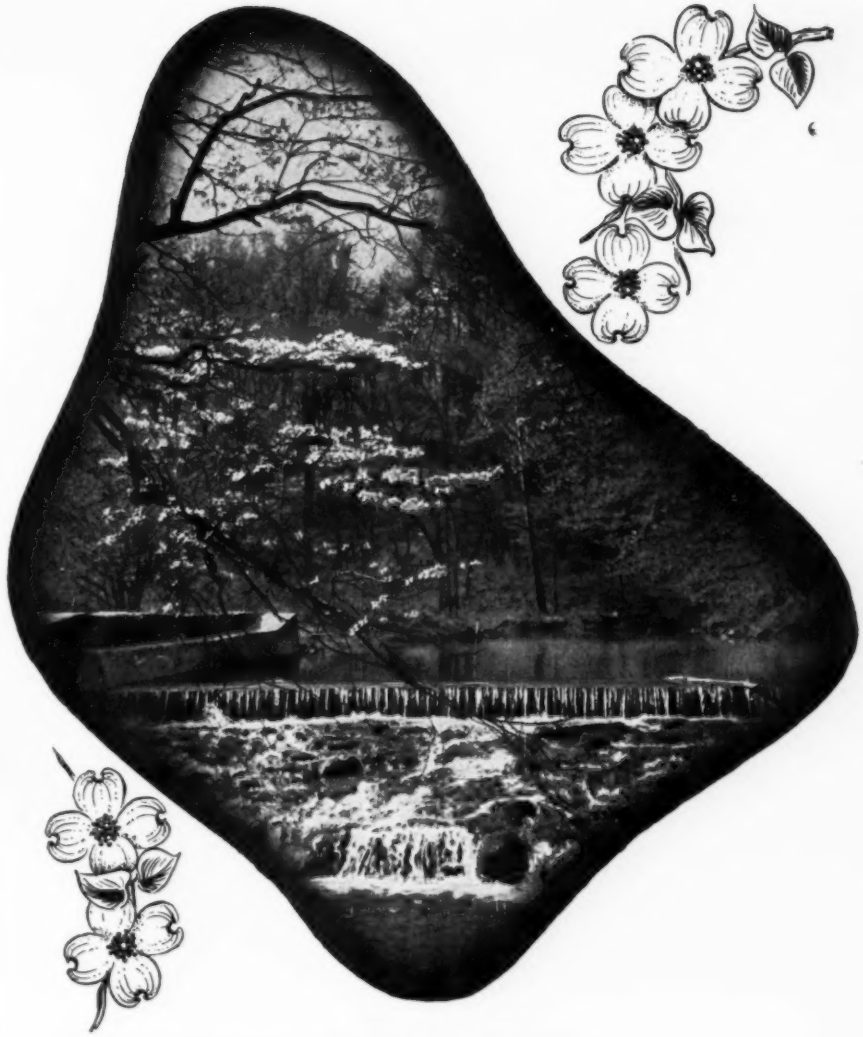
* * *

At the Toronto meeting of the Federation last October, Dr. T. J. Phair, Deputy Minister of Public Health of Ontario said, and I quote —"Conventions are the most justifiable excuse for the organized release of inhibitions."—I like conventions because—

* * *

It's a new idea—and the manufacturers of that household garbage grinder advertised in the early pages of this magazine might take a tip from Mrs. Stu (Metcalf and Eddy) Coburn of Boston.

To demonstrate the new gadget to her friends Mrs. Coburn held a gar-



SEE THE DIFFERENCE,
IN COLOR-REMOVAL TOO

This spring would you like to obtain better color-removal? Then investigate the effect of activated silica sol as a coagulant aid.

N-Sol Processes of water coagulation are chosen because they shorten settling time, increase the capacity of filters, reduce the chemical costs, and also, improve the quality of the water produced . . . clear, sparkling water even when colors as high as 300 are encountered. In one water treatment plant, the color-removal was 85% to 90% before the use of the N-Sol Process, and after adoption the color-removal was stepped up to 95%.

Instead of a light, weak color floc, get a heavier, tougher floc and hence better color-removal with the N-Sol Process. Samples of N-Sol Process activated silica sols for jar tests are available on request.

N-SOL PROCESSES FOR WATER COAGULATION

DEVELOPED AND PATENTED BY
PHILADELPHIA QUARTZ COMPANY, PHILADELPHIA 6
AVAILABLE UNDER LICENSE WITHOUT CHARGE

bage party, to which each guest brought the garbage from her previous day's cooking. According to the local gazette, all present had a lovely time watching the swill disappear down the drain.

* * *

Rudyard Kipling Said It.

"I keep six honest serving men,
They taught me all I know
Their names are What, and Why, and When
And How, and Where, and Who?"

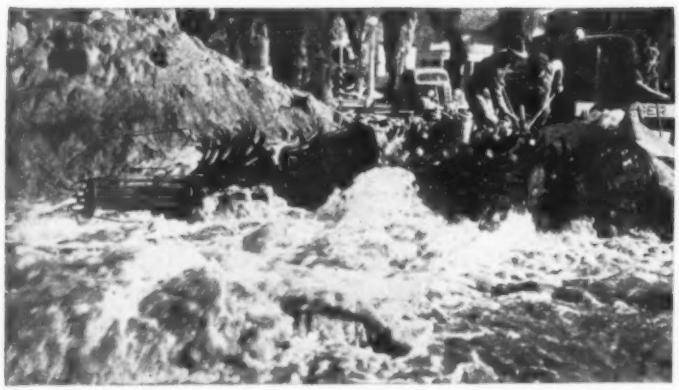
* * *

Special Announcement! !—Scoop. Here's a scoop picture of a table of delightful dinner companions at the Md.-Del. Water and Sewage Works Assn. meeting in Washington last month. — No other publication will have this picture — If you want to know them just turn this page about 90 degrees and see Ralph Fuhrman (Supt. Sew. Tr. Washington); Paul D. McNamee (Chemist, same place); Mrs. Ellwood (Supt. of D. C. Sewers) Johnson; Rollie (Omega Feeder) Leveque; and Jo (Mrs. Ralph) Fuhrman. That shadow at the left edge of the picture is cast by Paul (P.F.T.) Cerny who paid for this picture and should therefore have his name mentioned; the rim of the eyeglass at the right is mine; and Ellwood Johnson didn't get in the picture at all.

* * *

Ferd (W&T) Fisher's "Leaky Faucet Drips" in the Ohio Sect. News Letter, reminds me that Victor Borge, the Danish Pianist-Comedian, gave Water Commissioner Throckmorton P. Gildersleeve a definition

YOUR PROBLEM IS OUR PROBLEM



In 1940, Riverside, California, had two miles of 30 and 36 inch pipe to clean. We built a special combination tool that took care of both sizes of pipe without making any change for the difference in pipe sizes. Both systems were relined after cleaning. Regular annual inspections since that date show no breaks of any kind and indicate fully 50 years more of continual service since both pipe lines are specially protected by exterior wrapping.

Write for illustrated circular today.
Address Department WS-6.

FLEXIBLE UNDERGROUND PIPE CLEANING CO.

9059 Venice Blvd., Los Angeles, California

855 Board of Trade Bldg. Chicago 4, Ill.
401 Broadway New York 13
147 Hillside Ter. Irvington, N. J.
P. O. Box 165 Atlanta
1624 Harmon Place Minneapolis 3, Minn.
29 Cerdan Ave. Roslindale 31, Mass.
P. O. Box 894 Pittsburgh
P. O. Box 447 Lancaster, Texas
41 Greenway St. Hamden, Conn.

of water as follows: "Water is stuff, which if there weren't any, Duz couldn't do anything."

* * *

Special Announcement! ! ! !—And this is the one for which you and Buffalo Bodie have been waiting.—Through the courtesy of the Gillette Publishing Co., this column will appear in these pages for two more years.—Know any easier way to make a living?—V.T.Y. Doc.

* * *

"Tight-Wad!"

Waiting to see the boss? No, just dropped in to read "DOC" SYMONS' COLUMN!

[Overflow from the main section]

Havana Mayor Suicide Over Water Supply

Dr. Manuel F. Supervielle, the Mayor of Havana, Cuba, shot himself on May 4 because he could not carry out his election promise to provide a $17,000,000 water works project.

On the basis of his election campaign to provide an adequate water supply, Dr. Supervielle won the election easily a year ago, but his efforts to get the water works project financed failed because of lack of approval of the Cuban government.

Just in case you think *all* Jointing Compounds are pretty much alike

HERE'S ONE THAT'S QUITE DIFFERENT!

It includes pure sulphur, plasticized with synthetic rubber, to insure lower initial leakage . . . and tighter joints.

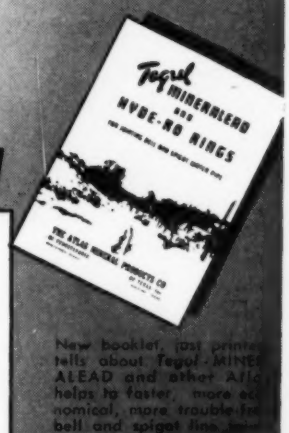
Laying is speeded up. Ditches may be backfilled at once, clearing up traffic hazards due to open trenches. Joints are not hurt by vibration from traffic, nearby machinery, etc.

Tegul-MINERALEAD comes in ingots, clean, easy-to-handle, conveniently packaged in cartons of 50 lbs. These ingots reach your job as correctly mixed as when they left our plant. No amount of jolting en route can upset their correct physical composition.

They're impervious to snow, rain, flood. No amount of wetting will hurt them or cause trouble in melting. Also, caulking and deep bell holes are not required.

Specific Gravity is only 1/5th that of lead. You use much less *Tegul*-MINERALEAD. You save — on material, shipping costs . . . on labor too. *Tegul*-MINERALEAD works with pipe of any diameter and in summer and winter temperatures — no matter how extreme.

THE *Atlas Mineral*



PRODUCTS COMPANY OF PENNA.
MERTZTOWN PENNSYLVANIA

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*CHICAGO 1, Ill., 333 No. Michigan Ave.
*DETROIT 2, Mich., 2970 W. Grand Blvd.
NEW YORK 16, N. Y., 280 Madison Ave.
PITTSBURGH 27, Pa., 4921 Plymouth Rd.
ST. LOUIS 8, Mo., 4485 Olive St.

THE ATLAS MINERAL PRODUCTS CO. OF TEXAS, INC. Box 252, Houston 1, Texas

DALLAS 5, Tex., 3921 Purdue St.
*DENVER 2, Colo., 1921 Blake St.
*KANSAS CITY 2, Kan., 1913 Tauromee Ave.
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*SALT LAKE CITY 11, Utah, 925 S. 6th West St.
SAN FRANCISCO 7, Calif., 115 Townsend St.
*SEATTLE 4, Wash., 1252 First Avenue, S.
*Stock carried at these points

IN CANADA: Atlas Products are manufactured by H. L. BLACHFORD, Limited, 977 Aqueduct Street, Montreal, P. Q., 86 Bloor St. W., Toronto, Ont.

New booklet, just printed, tells about *Tegul*-MINERALEAD and other Atlas helps to faster, more economical, more trouble-free bell and spigot line ... ing. Write Mertztown requesting Bulletin WB6.

Dr. Supervielle was 52 years old, an attorney, and former Dean of the Havana College of Law. In a farewell note he stated "Confronted by insuperable obstacles and faced with failure — something which I cannot bear—I have decided to commit suicide".

New Chlorine Manual

Published by the Chlorine Institute, Inc., for Free Distribution

Here is authoritative and up-to-date information concerning the characteristics and handling of liquid chlorine. The chlorine industry of the United States and Canada has cooperated, through the Chlorine Institute, Inc., in providing this convenient and useful 32 page booklet. It is packed with useful recommendations and with helpful suggestions which are based on the long experience of chlorine producers.

The Chlorine Manual, of a size for easy filing, is divided into four sections. The first section, titled "Facts About Chlorine," summarizes the significant characteristics of chlorine, describes briefly some of its important properties, and lists its physiological effects. Several pages are devoted to chlorine containers: cylinders, ton containers, and single unit tank cars. The construction and safety features of each type of container is illustrated and described.

The second section of the Manual, headed "Handling Chlorine," supplies specific recommendations concerning the best practice in moving, storing and handling chlorine containers. Prevention of accidents is stressed throughout and by following the simple rules given, trouble should be very rare indeed.

Under "Employee Protection," the title of the third section, definite emergency measures for dealing with chlorine leaks are described. A repeated warning is given against applying water to a chlorine leak, and emergency preparations for absorbing chlorine in caustic soda or other alkaline solutions are given in some detail. This section also lists prophylactic measures and gives the best practices recommended in first aid treatment for persons exposed to chlorine in high concentrations.

A "Data Section" of twelve pages completes the booklet. This section includes four graphs and an extensive discussion of the chemical and physical properties of chlorine. It concludes with several pages of literature references concerning chlorine, chlorination, and regulations regarding chlorine handling.

It is apparent that considerable thought has been given to making the "Chlorine Manual" of maximum usefulness to the non-technical person who handles chlorine containers and to the technician who is concerned with detailed information and with the design and equipping of chlorinating stations. The manual is easy to read, and each user of chlorine will find some new and useful information in it. For a free copy, write to The Chlorine Institute Inc., 50 East 41st St., New York (17) N. Y.

Correction!

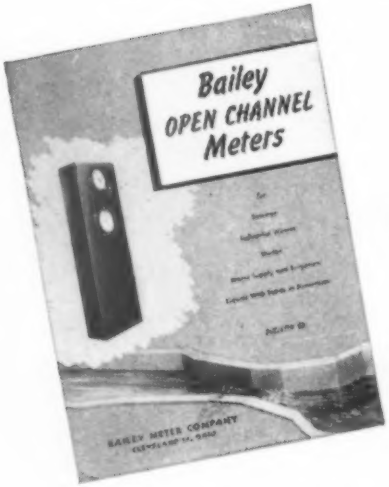
N.J.S.W.A. Meeting Report

In our April issue in the New Jersey Sewage Works Association report, on page 152, Frederick V. Hugo, Secretary of the Joint Meeting Rutherford, East Rutherford, Carlstadt, New Jersey, was credited with stating that the budget for this 1.25 mgd. plant is only $50,000 a year. Mr. Paul Molitor, Superintendent of the Joint Meeting, points out that the plant has a 2.25 mgd. capacity, and that the $50,000 a year

THE BAILEY OPEN CHANNEL METER

1. Retains Accuracy
2. Self-Cleaning
3. Easy to Install
4. Easy to Maintain
5. Adjustable Capacity
6. Indicates, Records, Integrates
7. Totalizes Multiple Flows
8. Simple Chemical Feed Control
9. Rate of Flow and Ratio Control

A Reliable Low Cost Meter for



SEWAGE
INDUSTRIAL WASTES
SLUDGE
IRRIGATION WATER

Ask For Bulletin 62

MU23

BAILEY METER COMPANY
1072 IVANHOE ROAD • CLEVELAND 10, OHIO
METERS and CONTROLS for SEWAGE and WATER
VENTURI TUBES, FLUMES, WEIRS, NOZZLES, ORIFICES • DIRECT MECHANICAL AND REMOTELY LOCATED REGISTERS • AIR-OPERATED, ELECTRONIC AND ELECTRIC CONTROLS.

includes $6,500 for capital improvement. Thus it is obvious that the actual cost of operation on a per-million gallon basis is much more favorable than was indicated in the report.

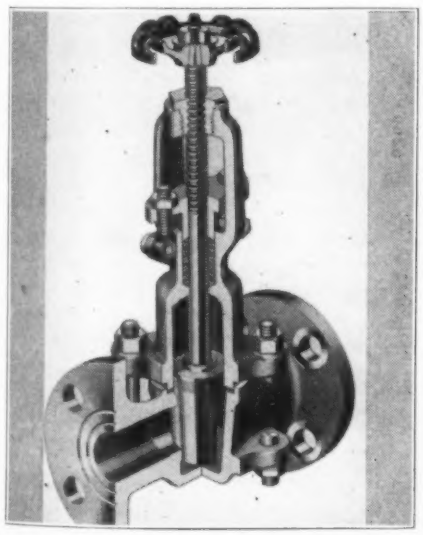
Mr. Molitor also points out that whereas he is credited with saying that the plant has a diversion weir for high flows, actually that plant has "no bypass, diversion weir, or otherwise", and that they just have to "take it" at times of high flow.

Our apologies to Messrs. Hugo and Molitor for these inaccuracies in reporting their comments at that meeting.

MANUFACTURERS' and EQUIPMENT NEWS

Crane Announces New Plug Gate Valves

Crane Co., Chicago, has announced a new line of corrosion-resistant plug gate valves. These valves are unique in that they combine the advantages of the two most



important basic types of valves, providing a straight-through flow in the wide open position as do convention gate valves, but with suitable throttling service as in conventional globe valves.

Listed among the advantages of these plug gate valves are the low resistance to flow in the wide open position, having a maximum discharge equal to that of a wedge gate valve and twice that of globe valve; closer throttling at high and low velocities; resistance to cutting action of fluid in throttled position. These valves are not subject to sticking in the closed position, even though closed while hot and opened when cold, and there is no tendency to galling, often present in alloy wedge gate valves, especially in the small sizes.

The valve is of the outside screw and yoke design, has bolted bonnet joints, and may be obtained in either screwed or flanged ends in sizes from ½ to 2 inches. Regularly furnished in either 18-8 Mo or Monel metal, these valves may be obtained in other alloys to customer's specifications for particular conditions.

For further information, write the Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.

Glauber AGAIN OFFERS YOU A COMPLETE LINE OF COPPER PIPE GROUND KEY STOPS AND FITTINGS

Red Brass inverted key curb stops with round way for copper service pipe both ends. Other ground key work, fittings and lead goosenecks for your waterworks requirements.

THE GLAUBER BRASS MFG. CO.
Kinsman, Ohio
Division of H. B. Salter Mfg. Co.
Marysville, Ohio

Glauber RED BRASS
GROUND-KEY CURB and CORPORATION STOPS
LEAD GOOSENECKS and WATERWORKS FITTINGS

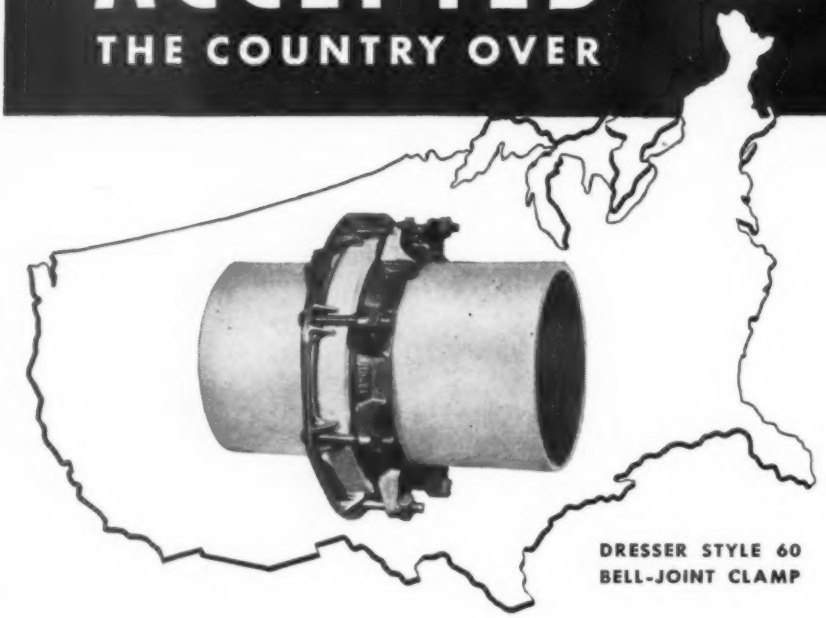
Mathieson Alkali News

The Mathieson Alkali Works has announced the appointment of H. Webster Stull as Director of Personnel, a newly created position. Mr. Stull will supervise all hourly employee and union wage contracts and negotiations, coordinate personnel and manpower requirements between departments and plants, and assist in developing company-wide personnel policies on insurance, retirement, security, incentive, benefit, vacation, recreation, educational, safety and other salaried or hourly employee

programs and plans. He will be directly responsible to the president.

Mathieson Alkali Works has announced that beginning this year three and four week vacations will be granted to employees with long periods of service with the company. More than one-third of the Mathieson employees will benefit. Female employees with ten years of continuous service will have three weeks' vacation, and male employees with fifteen years of service will have three weeks' vacation. All employees with 25 years of service on or before the first of this year will receive four weeks' vacation. The new plan is company-wide in scope and applies alike to salaried and waged personnel.

ACCEPTED
THE COUNTRY OVER



by engineers, superintendents, foremen

THE PROOF—Most utilities from coast to coast have standardized on the Style 60 for repairing leaking bell-and-spigot joints.

THE REASON—Engineers have approved the design as providing the most effective seal against leakage. Foremen endorse its unique adjustability which provides a better fit, regardless of varying pipe diameters.

Sizes 3″ to 60″ CIP.

DRESSER STYLE 60 BELL-JOINT CLAMPS

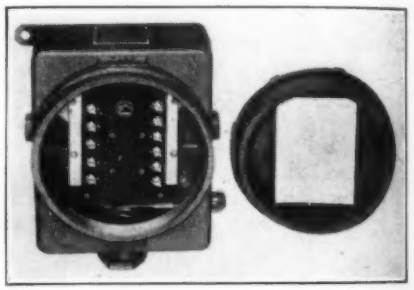
ONE OF THE DRESSER INDUSTRIES

Dresser Manufacturing Division, Bradford, Pa. • 1121 Rothwell St., Houston, Texas.
In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ontario.

New Liquid Level Control

Photoswitch Incorporated has announced the availability of a new liquid level control. Known as Type 10CBIX, it has been designed for general application with particular consideration to the problems of the chemical processing field.

The Photoswitch design which employs contact with the liquid is made by stainless steel probe rods, eliminates the need for floats or other moving parts in the tank. No vacuum



tubes are used and accuracy is independent of temperature and pressure.

Level Control Type 10CBIX is supplied in explosion-proof housing, or in a pressed steel, dust-tight enclosure.

Further information on this new liquid level control may be obtained from Photoswitch Incorporated, 77 Broadway, Cambridge 42, Mass.

J. H. Jewell Mgr. Westinghouse Apparatus Sales

The Westinghouse Electric Corp. has announced the appointment of J. H. Jewell as manager of Apparatus Sales. A veteran of 27 years with Westinghouse, Mr. Jewell has been manager of the company's Industry Sales Department since 1944. Mr. Jewell holds the Order of Merit, the highest honor conferred on its employees by Westinghouse Electric Corp.

CHEMCO
Equipment
FOR
EVERY CHLORINATION
AND
WATER CONDITIONING
PROBLEM

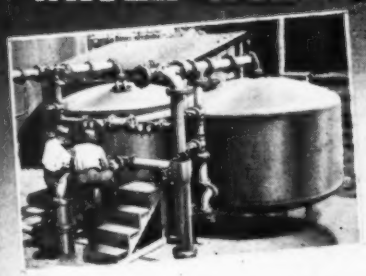
For Your
SEWAGE PLANT

CHEMCO CHLORINATORS are available for every type of installation. The above shows two CHEMCO 100# capacity chlorinator installed for the State of New York. Note use of Aqua-Thermal Coils.

For Your
SWIMMING
POOL

CHEMCO has "Everything for the Swimming Pool" from the Filters to the Life Preservers.

For Your
WATER WORKS



A large Chemco-Filter Plant installation for the Santa Fe Railroad, Winslow, Arizona. Consult CHEMCO first for your Chlorinator or Water Conditioning Problem.

CHEMICAL EQUIPMENT CO.
1700 NO. MAIN STREET
P. O. Box 3098 Terminal Annex
Los Angeles 54, Calif.
MIDWEST FACTORY BRANCH
211 W. Wacker Drive Chicago 6, Ill.
AGENTS IN PRINCIPAL CITIES

Pyrex Petri Dish

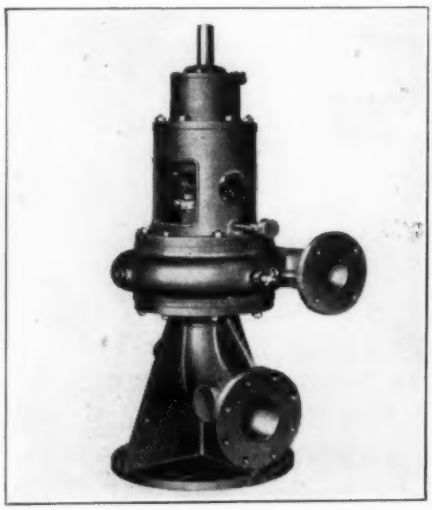
The Corning Glass Works has announced a new Pyrex Brand Petri Dish in which the inner bottom is held to a close flatness tolerance. The dishes are of rugged pressed construction and are mechanically strong, and said to outlast standard lighter dishes. They will withstand repeated sterilization, either wet or dry, without clouding or crazing.

A feature of the No. 3162 (heavier) dish is its raised outer edge which provides level three-point support, and prevents the bottom from being scratched. These Petri dishes accommodate the standard 100x15 or 100x 20 mm. covers.

For further information write the Laboratory & Pharmaceutical Sales Dept., Corning Glass Works, Corning, N. Y.

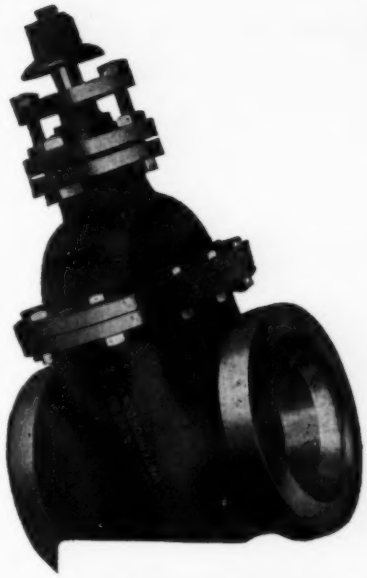
Worthington Announces New Sewage Pumps

A new line of Worthington "dry pit" centrifugal pumps has been introduced by the Worthington Pump & Machinery Corp., Harrison, N. J. These new pumps have been designed and standardized for maximum interchangeability of parts. There are seven different sizes in each of three types covering complete range of requirements.



Features of these pumps include renewable shaft sleeve, heavy duty ball bearings, positive grease lubrication, non-clogging impeller, and rugged casing.

Line drawings, scaled ⅜ to 1 inch, suitable for tracing in plans, are available to consulting engineers on request and others interested may obtain information from the Worthington Pump & Machinery Corp., Harrison, N. J. Write for bulletin W-317-Blo.



EDDY
Valves
and HYDRANTS

WILL THE MEN WHO FOLLOW YOU SAY YOU "KNEW YOUR STUFF"?

They will if you put in valves and hydrants now that will still be trouble-free in years to come. To be sure of this, specify EDDY —when you buy. EDDY products have been built by men with three generations of specialized experience. Eddy products have served three generations of water works men exceptionally well. Buy the product you know you can depend on.

EDDY FOR LONG SERVICE

EDDY
VALVE COMPANY
ERFORD, NEW YORK

Bailey Meter Co. Appoints Puerto Rican Agent

The Bailey Meter Co. of Cleveland, Ohio, manufacturers of water and sewage metering equipment, has appointed the Portilla Corporation as its agent in Puerto Rico. The Portilla Corp. has taken over the business formerly conducted by H. Clyde Gregory, Inc. It will act as the agency for the sales, installation, and servicing of Bailey equipment in Puerto Rico, Republic of Haiti, Dominican Republic, and the Virgin Islands.

Pennsalt 2,4-D in Liquid Form

Knox-Out Weeds Liquid is a new liquid 2,4-D compound sold by Pennsylvania Salt Mfg. Co. One pint of this liquid weed killer, easily mixed in 20 gallons of water, will effectively treat 4,000 square feet of planted surface. The liquid has several advantages over the powder, including effectiveness of action, economy, and simplicity of use.

It will be sold in 8-ounce and one pint glass bottles by the B-K Division and Household Products Division of Pennsalt.

This new product may be used for controlling hay fever weeds, eradication of poison ivy and other toxic weeds, spot elimination of weeds from lawns, walls, vacant lots, and ditch banks.

Further information may be obtained by writing Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

Evans Succeeds Richards as Diamond Alkali's President

Raymond F. Evans has been elected president of the Diamond Alkali Co. of Pittsburgh, Pa., to succeed John T. Richards who has announced his retirement as president and chairman of the board.

In retiring at 59, Mr. Richards concludes an enviable 30 year record

R. F. Evans J. T. Richards

with the company. He joined Diamond Alkali in 1917 as a clerk and rose through the ranks to become its president in 1937 and chairman of the board in 1943.

Mr. Evans joined Diamond in 1931, after leaving Princeton where he majored in chemistry. He began his career in operational work and then went into experimental projects where he laid the framework for the large research and development unit the company now has. Mr. Evans headed the research division in 1941 and since that time has been in the management of subsidiaries of Diamond Alkali. Four years ago he became vice president and general manager of Diamond Alkali's Painesville, Ohio, plant.

Geist Reelected President of Allis-Chalmers

At the annual meeting of the stockholders and board of directors of the Allis-Chalmers Mfg. Co., Mr. Walter Geist was reelected for his sixth term as president of the company.

In the course of cleaning close to forty million feet of pipe over a period of more than forty years, the National Water Main Cleaning Co. had developed highly specialized methods and equipment for removing practically any type of pipe accumulation or obstruction quickly, economically and thoroughly.

National Know How Pays.

NATIONAL WATER MAIN CLEANING COMPANY

50 CHURCH STREET, NEW YORK 7, N. Y.

ATLANTA.....1221 Mortgage Guarantee Building
BOSTON.....115 Peterboro Street
CHICAGO.....205 West Wacker Drive
HOUSTON.....2518 Grant Street
KANSAS CITY.....421 B.M.A. Building
LOS ANGELES.....448 South Hill Street
MEMPHIS.....822 Dermon Building
OMAHA.....3812 Castellar Street
RICHMOND.....210 East Franklin Street
ST. LOUIS.....7103 Dale Avenue
SALT LAKE CITY....149-151 W. Second South Street
SAN FRANCISCO.....681 Market Street
MONTREAL.....2028 Union Avenue
WACO.....P. O. Box 887
WINNIPEG.....576 Wall Street
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OMEGA

The Last Word in Chemical Feeders

OMEGA Chemical Feeder Specialists — builders of a complete line of Gravimetric, Volumetric and Solution Feeders for every waterworks application.

MATERIALS both dry and in solution are handled: lime, soda ash, activated carbon, alum, sulfates, Ferrisul, Ferri-Floc, hypochlorite, etc.

EXCEPTIONAL feeding range is covered by the line: dry feeders from 0 to 10,000 lbs. per hour; solution feeders from 0 to 800 gals. per hour.

GUESS WORK is eliminated — feeding performance can be relied upon — with OMEGA you know the correct amount of chemical is being fed.

ALL OMEGA feeders are simple in design, trouble-free, and proven in service. They are the answer to your feeding problem and will save you money.

OMEGA PRODUCTS

GRAVIMETRIC FEEDERS
Loss in Weight Type, Bulletin 20-23
Belt Type, Bulletin 24-27

VOLUMETRIC FEEDERS
Universal Feeder, Bulletin 1-4
Disc Feeder, Bulletin 18-21
Rotolock Feeder, Bulletin 50-52
Precision Solution Feeders, Bulletin 9-12
Rotodip Solution Feeder, Bulletin 46-49

LIME SLAKERS, Bulletin 5-8

DUST REMOVERS AND FILTERS, Bulletin 42-45

LABORATORY STIRRERS, Bulletin 13-14

Send for Bulletins and complete information.

OMEGA MACHINE CO.
(Division of Builders Iron Foundry)
10 Codding Street, Providence 1, R. I.

Fox Sales Mgr. Rusta Restor

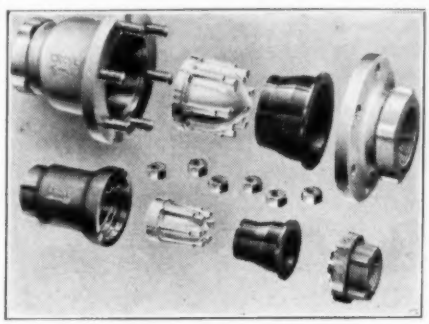
The Rusta Restor Division of The Johnston & Jennings Co., Cleveland, manufacturers of cathodic protection equipment, has announced the appointment of George L. Fox as Sales Manager.

Mr. Fox formerly represented the company in Michigan and later in the Ohio territory. He succeeds A. B. "Tag" MacTaggart, who is retiring from sales work to devote his full time to research and development.

Improved Check Valve

Operating on a low differential pressure, the new Grove Chexflo Valve has been developed by the Grove Regulator Co. of Oakland, Calif.

These valves embody no metallic operating parts to stick, slam, chatter, or leak, and therefore contribute to improved operating characteristics. This simplified line of check



valves operates on low pressure differential, and is available in sizes ranging from ½ to 12 inches.

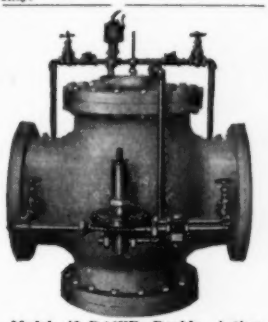
The outstanding feature of the Chexflo Valve is its tough flexible tubular operating member. Due to its resiliency, the tapered synthetic rubber lip, shown in the accompanying photograph, contracts smoothly to close on slack flows. The degree to which it opens or closes is in direct ratio to the flow volume.

Further information on this new type valve may be obtained from the Grove Regulator Co., 65th and Hollis Sts., Oakland, Calif.

Est. 1879

ROSS AUTOMATIC VALVES

Altitude Valves for tank and reservoir, with two sets of controls—Automatic Hydraulic and Electric Remote Control. Hydraulic pilot normally operates the valve, while electric pilot is used for emergency only.



Model 40-DAWR Double Acting may be operated by electric pilot regardless of elevation of water in tank or reservoir, for a break in supply or distribution and when fire pressures require direct pumpage.

Model 30-AWR Single acting valve may be controlled in same manner as the Model 40-DAWR.

Model 40-AWR Single Acting semi-throttling valve will close on reversal of flow and the electric pilot would serve only a single purpose—either to open wide or close as emergency may require.

ROSS VALVE MFG. CO.
Incorporated
P.O. BOX 595, TROY, N.Y.

Gorman-Rupp Septic Tank Cleaner

The Gorman-Rupp Co. of Mansfield, Ohio, has announced an "odorless sanitary cleaner" to serve areas outside city sewer systems. This new "O.S.C." unit consists of an 1100 gallon steel tank served by a Gorman-Rupp self-priming, centrifugal sewage pump and driven by a 20 hp., 4 cylinder Wisconsin air-cooled gasoline engine. The entire unit mounts on any standard truck chassis of 158 to 161 inches in length. To operate this unit, the "O.S.C." operator simply backs his truck near an open septic tank, cess-pool, basin, etc., inserts the hose lines and couples them up. The fluid in the tank is drawn into the pump and jetted back into the septic tank through the upper hose line until all the solids are put into suspension. Then by simply closing the recirculating valve the contents of the septic tank are quickly pumped into the truck tank.

Tests indicate that a 500 gallon septic tank can be emptied in this sanitary fashion in 15 minutes and a 1000 gallon tank in 20 minutes. In one case a 25,000 gallon septic tank was cleaned thoroughly in ten hours, a job that formerly required two weeks with old style methods.

The "O.S.C." unit has many uses and can be used for basin or sump drainings, street flushing, sprinkling, emergency fire fighting, dewatering flooded basements, for hauling water for construction work, etc., etc.

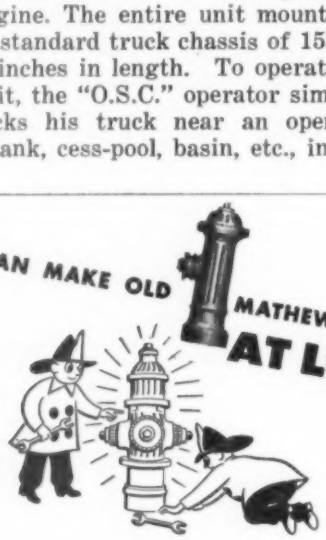
Further information on this multi-use unit may be obtained from the Gorman-Rupp Company, Mansfield, Ohio.

Dustproof Concrete Floor

The Wilbur & Williams Co. of Boston, Mass., offer Dye-Crete to harden color and dustproof a concrete floor. This material secures results by changing the composition of the concrete, thereby becoming an integral part of the floor, and it is not to be confused with coatings which merely cover the surface without penetrating.

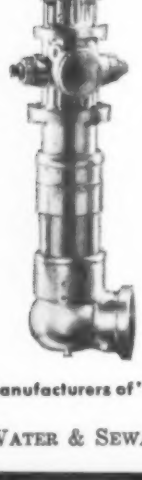
Dye-Crete penetrates into the concrete with all its color, requires no etching, dries quickly, hardens and dustproofs concrete floor, may be applied over damp or old concrete and maintains uniform color with wear. It is unaffected by free lime in concrete, is resistant to greases, washings, gasoline, alcohol, etc. It will harden and seal concrete to prevent dusting.

YOU CAN MAKE OLD MATHEWS HYDRANTS NEW AT LOW COST!



One big, exclusive advantage of Mathews Hydrants is that old ones can be made new—in a few minutes, and at large savings. All it takes to modernize even the oldest Mathews is the modern barrel, for the barrels are interchangeable, and contain all the working parts. Off with the old, on with the new—an easy, *above-ground* operation—and Mathews 40, 50, 60 and more years old do the same work as today's great, fire-fighting model.

Mathews installed long ago still function perfectly. But conditions have changed, and more is demanded of a hydrant today. By the simple changeover of old barrel to new, communities are converting their old Mathews into the finest of modern types with pumper connections. At the same time they are preserving a large part of their original investment. Let us quote you the low cost at which *your* community can modernize.



OTHER FEATURES OF MATHEWS LEADERSHIP

Head can be rotated a full circle, on swivel flange • Replaceable head permits change in nozzle outlets • Nozzle levels can be raised or lowered • Barrel screws into bronze bushing in elbow • Operating thread (easily accessible) is only part that needs oiling • Stuffing box plate cast integral with the nozzle • Shield operating nut keeps out dust, rain, sleet • Positive, automatic drain valve; true compression-type main valve • Maintenance and repair expense kept to the minimum.

MATHEWS HYDRANTS

Made by R. D. WOOD COMPANY

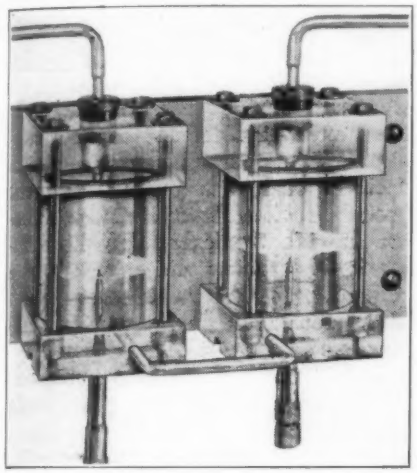
PUBLIC LEDGER BUILDING, INDEPENDENCE SQUARE, PHILADELPHIA 5, PA.

Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R. D. Wood Gate Valves

Further information on Dye-Crete may be obtained from The Wilbur & Williams Co., Greenleaf and Leon Sts., Boston 15, Mass.

Precision Hook Gage

A new hook gage, known as the Dwyer Transparent Hook Gage, is now being offered by the F. W. Dwyer Mfg. Co. of Chicago. This new device works on the simple principles of the "U" type water column gage, but eliminates the capillary pull on the usual water columns by widening the columns to 2½ inches. Measurements are taken from the center of the column by needle pointed "hooks" which are attached to depth micrometers of standard make.



With the exception of the hooks and micrometers, the entire gage is made of an unbreakable transparent plastic with no moving parts. To date this instrument has been used largely in scientific laboratories and by manufacturers who use it principally for checking other instruments. It may be applied anywhere that a steady pressure within its scale range must be correctly measured.

Complete information may be had by mailing a request to the F. W. Dwyer Mfg. Co., 317 S. Western Ave., Chicago, Ill.

D. B. Benscoter District Engineer of Dravo

Daniel B. Benscoter of Cincinnati has been appointed district sales engineer for the Machinery Division of Dravo Corp. of Pittsburgh. The Dravo Corp. represents the DeLaval Steam Turbine Co., and also manufactures and markets Dravo Counterflo commercial and industrial space heaters.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

This 12 inch pipe after BEING "GUNITED" CARRIED LOAD of 33,000 lbs WITHOUT CRACKING or DEFLECTING
another pipe not gunited CRACKED and COLLAPSED with Load of 17,300 lbs.

"GUNITE" SAVES SEWER IN CANADA

The pictures tell the story. A six-months old concrete pipe sewer line at Owen Sound, Ontario, was found to be failing under earth load. The tests shown above were made and convinced the city officials that a reinforced "GUNITE" lining would correct the trouble, and we did the job in 1934. The sewer was 36" and 48" diameters and one-half mile long.

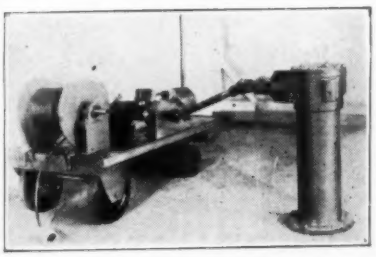
"GUNITE" is ideal for lining and strengthening old brick or concrete sewers and has been widely used for this purpose.

Our 72-page bulletin C2300 describes scores of profitable uses of "GUNITE." Write for your free copy.

MANUFACTURERS OF THE "CEMENT GUN"

PAYNE DEAN GATE OPERATOR

ONLY TWO MEN TO OPERATE YOUR LARGEST GATES. CUTS OPERATING TIME 80% -- NO BREAKAGE OF PARTS -- FITS ONTO YOUR EXISTING TRUCK -- FOR OPERATING GATES FROM 12" TO 60".



PORTABLE MOTOR OR GASOLINE OPERATOR FOR FLOOR STAND OPERATED SLUICE GATES AND UNDERGROUND GATES.

PAYNE DEAN & CO., MADISON, CONN.

84" pipe—Spring Lake, N. J.

FLANGED PIPE

FLEXIBLE JOINT PIPE

BELL & SPIGOT PIPE

SPECIAL CASTINGS

SHORT BODY BELL & SPIGOT SPECIALS

Large stock enables us to make prompt shipments.

CAST IRON PIPE

SIZES 2" TO 84"

Warren Foundry & Pipe Corp.

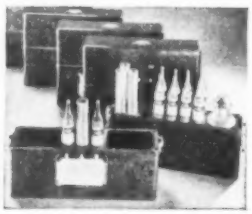
11 Broadway, New York

Warren Pipe Company of Mass., Inc.

A New LaMotte Item

THE LaMOTTE BLOCK COMPARATOR IN PLASTIC

"A Pioneer Goes Modern"



Non-corrodible Improved Color Fields. Smaller in size

A time-tested instrument that has reliably served the following fields for more than 26 years.

pH Control . . . . . **Price $12.50 ea.**
Chlorine Control . . . . . **Price $12.50 ea.**
Phosphate Control (incl. Polyphosphates) . . . . . **Price $15.00 ea.**

The new plastic comparator block will accommodate all LaMotte color standards of regular size (15 mm) new or old.

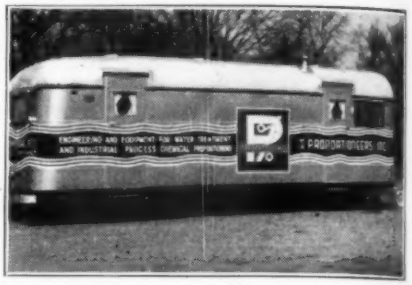
Write for illustrated literature

LaMOTTE CHEMICAL PRODUCTS CO.

Dept. WSW **Towson 4, Md.**

Proportioneers' Trailer

% Proportioneers, Inc.% of Providence, R. I., has developed a new demonstration trailer. Its first trip will be to the combined conventions of the American Water Works Association and the Federation of Sewage Works Associations to be held in San Francisco July 21 through July 25. Many of the company's latest units will be installed and operating in the trailer. Typical installations of equipment for chlorinating or



treating constant rate of flow systems and variable rate of flow supplies will be operating in conjunction with several new water treatment processes. The latter includes chlorine dioxide treatment for the elimination of tastes and odors, and a "chemistry-free" diatomaceous earth filter demonstrating the high efficiency of this type of filtration.

In addition to these new processes, individual units for emergency main sterilization, low cost emergency stand-by chlorination, and special proportioning pumps for feeding DDT emulsion for filter fly control will be on exhibit in the trailer. After the San Francisco convention, the trailer will be on exhibition in the larger cities on the West Coast.

New Type Gasoline Engine Driven Pump

A new light weight pump, particularly suitable for pressure water supply for homes, farms, ranches, cabins, etc., where electric power is not available, has been developed by the Diesel Pump & Electric Mfg. Co. of Glendale, Calif.

Known as the Depco pump, this new light weight unit is ideal for emergency installation. The vertical shaft arrangement of the engine provides a compact design. The pump has only one moving part, a cast bronze impeller with stainless steel shaft, directly coupled to the engine crankshaft. This construction provides a minimum of wearing parts while maintaining sturdy design for rough handling and continuous use.

The engine is two-cycle type and the pumps are available in sizes up to 2000 gallons per hour for deep well service depth; up to 3000 gph. for shallow well service; and 4000 gph. for larger volumes at lower pressures. A self-priming contractors' type pump with a capacity of 6000 gph. will shortly be available.

Further information on these Depco pumps may be obtained from Diesel Pump & Electric Mfg. Co., 110 W. Broadway, Glendale, Calif.

New Type Work Glove

The Riegel Textile Corp., New York, has introduced a new type of work glove. This glove carries a

guarantee that it will outwear any canvas work glove. Called the "Super Canton," it is soft and flexible and has a non-slip surface that facilitates gripping and increases protection.

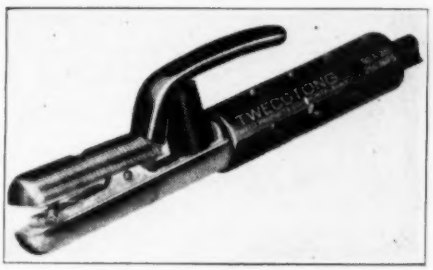
Further information may be obtained from the Riegel Textile Corp., 342 Madison Ave., New York 17, N. Y.

V. J. Calise, Tech. Mgr. of Liquid Conditioning

Liquid Conditioning Corp. of Linden, N. J. have announced the appointment of Mr. Vincent J. Calise as Technical Manager of their organization. Mr. Calise has long been associated with the development and production of ion exchange materials and the practical application of such materials in zeolite water softeners and other types of cation and anion exchange equipment.

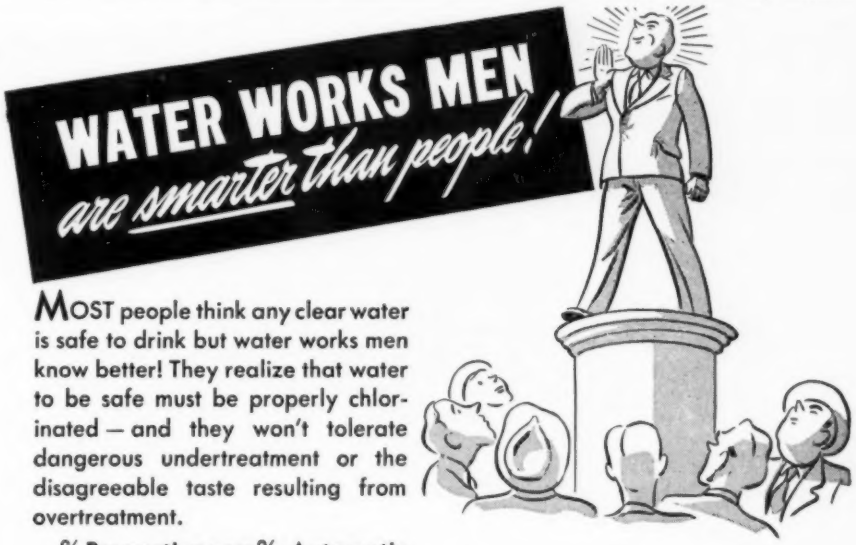
Welding Electrode Holder

The Tweco Products Company has announced a new model Twecotong Electrode Holder. This A-316 Twecotong Electrode Holder is a new addition to the line of insulated tong type electrode holders. It is a smaller companion to the A-14 and A-38 holders which have been on the market for some time. Its development fills the requirements of the average job shop or maintenance welder using 200



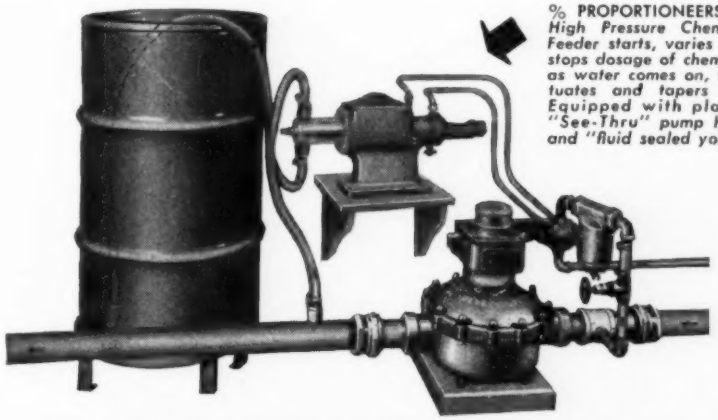
ampere welding equipment.

Further information on this new type welding tong holder may be obtained from the Tweco Products Company, P. O. Box 666, Wichita 1, Kansas.



MOST people think any clear water is safe to drink but water works men know better! They realize that water to be safe must be properly chlorinated — and they won't tolerate dangerous undertreatment or the disagreeable taste resulting from overtreatment.

%Proportioneers% Automatic and Proportional High Pressure Chem-O-Feeder has long been the favorite of wise water works men . . . paced by standard water meter, it automatically injects just the right amount of treating chemical at just the right time. No external source of power is required: the Chem-O-Feeder is hydraulically driven by the water in the main itself. Even when pressures are as high as 200 lbs. per sq. in. and the flow varies from minute to minute, the Chem-O-Feeder provides precise, dependable water treating. Other %Proportioneers% units are available to meet every operating condition. Information on request.



% PROPORTIONEERS % *High Pressure Chem-O-Feeder starts, varies and stops dosage of chemical as water comes on, fluctuates and tapers off. Equipped with plastic "See-Thru" pump head and "fluid sealed yoke".*

% PROPORTIONEERS, INC. %

9N CODDING STREET, PROVIDENCE 1, R. I.

AMERICAN GAS BOILERS
STEAM AND WATER TYPES
for Digester Heating

FOR RATINGS AND DATA SEE OUR PAGE IN THE 1946 ANNUAL REFERENCE SECTION

American Radiator & Standard Sanitary Corporation, Pittsburgh 30, Pa.

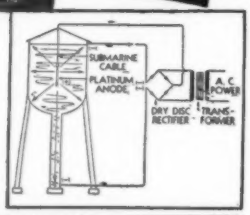
AMERICAN-Standard
HEATING PLUMBING
Serving the Nations' Health and Comfort

SALES OFFICES IN PRINCIPAL CITIES

RUSTA RESTOR Keeps Tanks in Continuous Service

Modern Proved Cathodic Method Provides Lasting Protection Against Rusting — Eliminates Both the Loss of Service, and Cost, of Interior Painting.

Engineered to the individual tank and water conditions Rusta Restor, the modern, cathodic method, maintains the tank in a "neutralized" state that not only prevents rusting but also removes the products of any earlier rusting. Approved and endorsed by national and state authorities. Inexpensive to install. Operation costs two mills ($0.002) per year per sq. ft. of surface protected.



RUSTA RESTOR
A DIVISION OF
THE JOHNSTON & JENNINGS COMPANY
853 ADDISON ROAD • • • CLEVELAND 14, OHIO

MECHANICAL EQUIPMENT BY ROBERTS FILTER MFG. CO. DARBY, PENNA.

KNOWN AROUND THE WORLD AS THE SIGN OF EXCELLENCE IN WATER TREATMENT EQUIPMENT

The years of experience behind the Roberts nameplate is your assurance that any water rectification problem is expertly handled to your best advantage. As manufacturing and installation engineers, the Roberts organization is equipped to meet your exact needs regardless of the size of the equipment or the complexity of the problem.

GRAVITY FILTERS • SOFTENING PLANTS AND EQUIPMENT • PRESSURE FILTERS ZEOLITE SOFTENERS • SWIMMING POOL RECIRCULATING APPARATUS SPECIAL WATER TREATMENT EQUIPMENT.

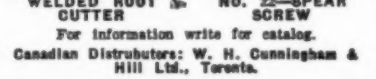
We invite your inquiries

ROBERTS FILTER MANUFACTURING COMPANY • *Darby, Pa.*

Your PIPE CLEANING PROBLEMS SOLVED

STEWART STANDARD WINDLASS

Frame. Sturdy angle iron construction. Cable drum holds 1100 ft. of ⅜" cable. Shipping weight without cable 250 lbs.



STEWART STEEL SECTIONAL ROD

STEWART GUARD CAGE COLLAPSIBLE BUCKET

NO. 9A STEWART WELDED ROOT CUTTER

NO. 11—SCREW
NO. 22—SPEAR SCREW

For information write for catalog.

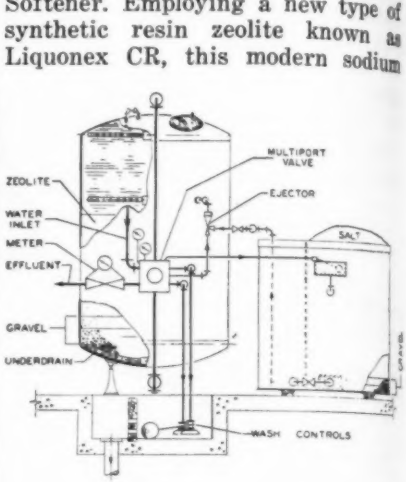
Canadian Distributors: W. H. Cunningham & Hill Ltd., Toronto.

W.H. STEWART

1051 SOUTH CLINTON ST.
SYRACUSE, N.Y.

Zeolite Water Softener

Liquid Conditioning Corp. has announced a new Liquon Zeolite Water Softener. Employing a new type of synthetic resin zeolite known as Liquonex CR, this modern sodium

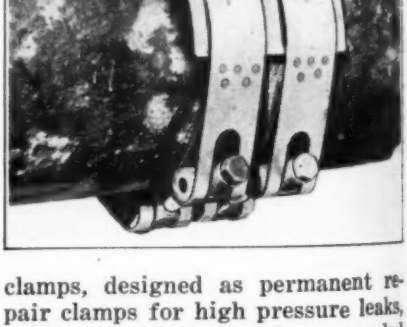


cation exchanger does not impart silica to the treated water.

Complete information on the design and adaptability for particular requirements of this zeolite softener may be obtained by addressing Liquid Conditioning Corp., Dept. WS, 114 East Price St., Linden, N. J.

High Pressure Pipe Leak Clamps

Marman Products of Inglewood, Calif., has announced a new line of high pressure pipe leak clamps. These



clamps, designed as permanent repair clamps for high pressure leaks, will stand up to 1100 psi. on corroded pipe without leaking. The clamps are made of stainless steel with Hycar rubber pads and weigh up to a maximum of only 6 pounds.

These clamps are being produced to fit all sizes of pipe from 2 to 8 inches. Larger sizes can be made on request.

Further information may be obtained from the Marman Products Co., Inc., 940 West Redondo Blvd., Inglewood, Calif.

Aluminum Solder

We recently announced in these columns a new aluminum solder called Prolyt. The name Prolyt has now been changed to Alsoco, and the solder will be marketed by the Alsoco Corporation, 10 E. 52nd St., New York.

For further information write to that company.

LITERATURE AND CATALOGS

Installing Pipe Underground

A newly issued 16-page bulletin is available from the Hydrauger Corporation Ltd., of San Francisco, titled **Hydrauger for Installing Pipe Underground.** This bulletin shows the labor saving advantages of these horizontal earth boring machines, and presents three new compressed-air operated models 10-A, L-2 and LHH-2 (a radically new, hand-held model). The equipment is available for boring holes 2 to 14½ inches in diameter. For this bulletin write Hydrauger Corp., Ltd., 116 New Montgomery St., San Francisco 5, Calif.

Maintenance Cleaning

Oakite Products, Inc., has prepared a digest of 71 different maintenance and related jobs in steam generating, electric power or light plants where Oakite cleaning materials and methods are being successfully used to expedite work, save time, keep equipment out of service time to a minimum, and increase efficiency.

These 71 commonly recurring maintenance and cleaning operations are fully described in this 20-page service digest, which gives concise data and specific method and material recommendations for the efficient handling of a wide range of cleaning, descaling, derusting, paint stripping, and related maintenance tasks in power plants.

Persons interested in such operations as cleaning and descaling heat exchange equipment, boiler room equipment; salvaging pumps, valves, fittings; stripping paint and varnish from motor housings, gas meters, etc., should write for this booklet 71.

Address requests to Oakite Products, Inc., 157 Thames St., New York 6, N. Y.

Midget Chlor-O-Feeder

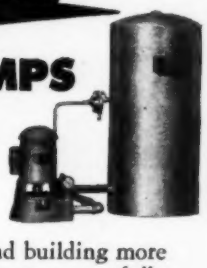
For the protection of small water supply in a simple and dependable manner at low cost, %Proportioneers, Inc.% recommend their **Heavy Duty Midget Chlor-O-Feeder** as described in Bulletin HDM-1. This 4-page bulletin has a discussion of the practical protection of small water supplies and shows by means of a photograph how the heavy duty Midget Chlor-O-Feeder may be installed in such a system. Specifications for the chlorinator are included, and although called a Midget Chlor-O-Feeder this chemical proportioning pump may be used for feeding all other chemicals used in water and sewage treatment plants from alum and ammonia to sulphuric acid.

Bulletin HDM-1 may be obtained from %Proportioneers, Inc.%, Providence 1. R. I.

Advanced **PEERLESS JET PUMPS**

Economically Produce the Water You Require for Light Industrial Needs

Capacities: 120 to 7500 Gals. per Hour. FROM WELL DEPTHS TO 120 FEET.



The Peerless engineering achievement of designing and building more efficient pumps with fewer moving parts has again been most successfully applied in the advanced Peerless Jet Pumping System. The trouble-free Peerless Jet Pump principle ingeniously applies the natural force of gravity, plus a minimum of mechanical power, to lift water upward by pressure from the Jet and force it to a pressure tank by means of an impeller. There is no simpler pump principle now being utilized where water lift requirements are comparable.

Peerless Jet Pumps are easy to understand, install, operate and maintain. Once the constant-pressure Jet Pump is in operation, adjustment or repair is rarely needed. Extremely compact in design. Double or single pipe systems available in sizes from ¼ to 3 H.P. Quietly supplies the water you require whether installed over the well or offset at a distance from the water source.

Ideally applied to wells 2" inside diameter and larger for water supply requirements of light industry including ice and refrigeration plants, creameries, dairies, milk plants, institutions, hotels, laundries, municipalities, motels, schools, etc.

Fully protected Under R. Moineau U. S. & Canadian patents.

See The **PEERLESS Water King** *Unique in design and operation. For shallow well installation only.*

CAPACITIES: 275 to 860 Gals. per Hour. For trouble-free simplicity of operation, this unique pump utilizes the same "magic" pumping element of the Peerless Hi-Lift Pump. Hard chrome pumping element wholly positioned and protected within pump base is highly resistant to abrasive and corrosive action. Assures a clean constant water supply. Requires a minimum of space and attention. 100% automatic. Easily installed over well or off-set.

Write for Bulletins describing these two most efficient pumps.

PEERLESS PUMP DIVISION

Food Machinery Corporation

Factories: Canton 6, Ohio • Quincy, Ill. • Los Angeles 31, Calif.

District Offices: Canton 2, Ohio; Philadelphia: Suburban Square, Ardmore, Pa.

Atlanta: Rutland Bldg., Decatur, Ga.; Dallas 1, Texas

INSTALLATIONS WORLD WIDE

LARGEST CITY TO SMALLEST VILLAGE

VALVES COMPLETE EQUIPMENT FOR WATER WORKS FILTRATION AND SEWAGE DISPOSAL PLANTS LATEST "COREY TYPE" HYDRANTS

Write for Catalogue and Information

IOWA VALVE CO.

General Offices:
Hubbell Bldg., Des Moines, Iowa

Plant:
Oskaloosa, Iowa

WILL SELL

all or part 500 tons miscellaneous cast iron water fittings, sizes ranging from 4" to 20", located Jacksonville, Florida.

Phone, Wire, or Write —

Albert Pipe Supply Co., Inc.

Berry and N. 13th St.
Brooklyn 11, N. Y.
EVERGREEN 7-8100

Portable Pumps

There are many occasions in the operation of water and sewage works and the laying of water and sewer lines when a portable dewatering pump is a handy thing to have around. Such a unit, packed with pumping power, is the **Homelite Gasoline Engine Driven Pump,** as shown in a 4-page bulletin published by the Homelite Corp., Port Chester, New York. If you want to see pictures of the pump and its typical uses, write for this bulletin.

Filter Control

The Venturi Direct Acting Model RCE **Builders Controller** is shown in Bull. 321B, issued by Builders-Providence, Inc. This 8-page bulletin includes a description of the features of this model of Builders Controller, pictures of five filter plant installations, a large cut-away photo of the parts and operation of the device, dimensions and capacities, and other pertinent information.

Write Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence 1, R. I. for a copy of Bull. 321B on the Venturi Direct Acting Model RCE Controller.

Waterproof Coating

Bituplastic is not a paint, it is a highly refined, easily workable coal tar pitch coating. It is applied in a coat five times as thick as a coat of paint. This information is contained in a bulletin entitled **Bituplastic,** issued by the Wailes Dove-Hermiston Corporation of Westfield, N. J.

Multi-Stage Centrifugals

Five stage centrifugals of 50 to 200 gallons per minute capacity are shown and described in Catalog No. B-1146 titled **1½ Inch, 5-Stage Type CS Vertically Split Case Economy Pumps.** These pumps are generally used in direct connection with electric motors but may also be driven by steam turbines, gasoline engines, or by chain or belt drive arrangements. These Multi-Stage pumps are restricted to clear liquid pumping and are especially applicable to boiler feeding, sprinkling, general water supply, and pneumatic water systems.

A copy of Catalog No. B-1146 may be obtained by writing Economy Pumps, Inc., Hamilton, Ohio.

LEADITE

The Pioneer Self-Caulking Material for C.I. Pipe

There is no substitute for LEADITE

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WATER PURITY TESTS
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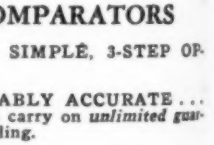

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Chicago's New Filter Plant

If you want to know about the "Largest Filter Plant in the World" you will find some interesting information and a number of photographs of cast iron pipe installations at this plant in the First Quarter issue of **Pipe Progress,** published by the American Cast Iron Pipe Company.

Pipe Progress can be obtained by addressing a request to the American Cast Iron Pipe Company, Birmingham 2, Ala.

Water Hammer

In the May 1947 issue of **The Ladle,** there appears an article on "Water Hammer, Its Cause and Cure" by Prof. Lewis H. Kessler. Professor Kessler is professor of Sanitary Engineering in Northwestern University Technological Institute, and Consultant for the Wade Manufacturing Co., of Elgin, Ill.

Professor Kessler's article deals with the subject of water hammer, the noise and damage it produces, and how it can be overcome. The article shows charts of the great fluctuation in water pressure due to rapid shut-off, and also illustrates a new device called a sealed air chamber for the reduction of water hammer and the attendant pressure. This mechanical pneumatic arrestor is an air cushion, sealed and permanently locked within a highly elastic metal bellows that compress and expand under essentially balanced pressure. This is the new device we announced in these columns recently as having been developed at Northwestern University by Professors Kessler and Gamet. At the present time the device is available in sizes from ½ inch to 2 inches of varying lengths. It has not yet been developed for larger sizes.

A copy of *The Ladle* may be obtained from the N. Y. State Master Plumbers' Association of New York City.

Fire Hydrants

Mr. Superintendent and Mr. Fire-Chief, the reasons why you should use Rensselaer Defender Fire Hydrants are presented in a 6-page folder, **Bulletin W** of the Rensselaer Valve Co., of Troy, N. Y. In addition to these reasons cut-away drawings of the fire hydrants and their operation and dimensional data are presented.

Bull. W. may be obtained from Rensselaer Valve Co., Troy, N. Y.

A New Item by LaMotte

ALGAE TREATMENT

Simplified by LaMotte D.M. Tube Inversion Rack

An accurate method for predetermining the effective dosage of Copper Sulphate in Algae Control. (Ref. William D. Monie, Water and Sewage Works, 93, 173-176, 1946).

The LaMotte D.M. Tube Inversion Rack, complete with 6 matched graduated tubes with stoppers, $15.00 f.o.b. Towson, Md. Reagents and glassware to complete the apparatus for this test supplied at standard prices.

Write for descriptive literature

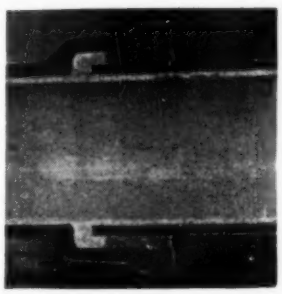
LaMOTTE CHEMICAL PRODUCTS CO.

Dept. WSW **Towson 4, Md.**

The* TATE *Cement Lining Process

Restores efficiency of old Water Mains

***Now* is the time to investigate the Tate Cement Lining process —and see what it can do to restore the efficiency of your old water mains.**



View showing Tate Process in Pipe Joint. Note thoroughness of Lining.

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1. **Water mains cleaned and cement-lined without removing pipe.**
2. **Eliminates discoloration and further cleaning costs.**
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5. **All joints cement-lined . . . just one continuous pipe.**
6. **Does the job without interruption of service to consumer.**

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For more than thirty years water works superintendents have been using Hydro-tite for joining bell and spigot pipe. They have found that this self-caulking, self-sealing compound costs less to buy, requires less labor, makes tighter joints and withstands the effects of time, strain and vibration. Send for data book and sample.

ALWAYS USE FIBREX, the bacteria-free packing for pipe joints. Send for sample.

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Protective Coating

Vol. 102, No. 1 (English Edition) of the **Dearborn News,** published by the Dearborn Chemical Co. of Chicago, has a story on the 60th Anniversary of the company. In addition there are two stories of great interest to water and sewage works superintendents and engineers. The first of these deals with how to prepare metal surfaces for high melting NO-OX-ID for use in protecting steel filters and equipment, and the second tells how a 720,000-gallon water tank was coated with NO-OX-ID for the prevention of corrosion.

The Dearborn News may be obtained by writing Dearborn Chemical Company, 310 South Michigan Ave., Chicago 4, Ill.

Garbage Grinders

In bulletin 796, the Jeffrey Manufacturing Co. of Columbus, Ohio, is described **Jeffrey Garbage Grinders** for municipal grinding plants where garbage is to be disposed of through sewerage systems. The bulletin contains pictures of installations serving municipalities of 75- and 150,000 population. One section of the bulletin is devoted to garbage grinders for dual disposal plants, and discusses the effect of garbage grinding on sewage treatment. Pictures and diagrams are shown of the Series "B" garbage grinder for larger municipalities and the Series "A" garbage grinder for municipalities under 20,000 population.

Bulletin 796 may be obtained by writing the Jeffrey Manufacturing Company, Columbus 16, Ohio.

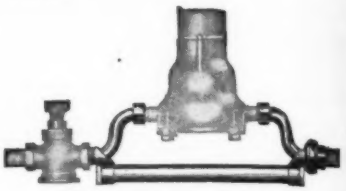
Portable Air Compressor

In a four page folder the Davey Compressor Company has presented descriptions of the new **Davey Air Chief Compressors.** The bulletin contains photos and detailed mechanical specifications of 60, 105, 160, 210, 315 cfm. capacity machines. Among the features included in these portable air compressors are the Permanent Peak Efficiency Valves and a new type of crank shaft named the Equi-Balanced Crankshaft which spreads (equalizes) working strokes of the compressor cylinders evenly over the 360° of compressor rotation.

This bulletin on the Davey Air Chief may be obtained by writing the Davey Compressor Co., Kent, Ohio.

LINESETTER

The simplicity and low cost of ordinary meter couplings PLUS permanent connection and electrical bonding for service pipe, insuring against difficulties in meter changing and facilitating service installation.



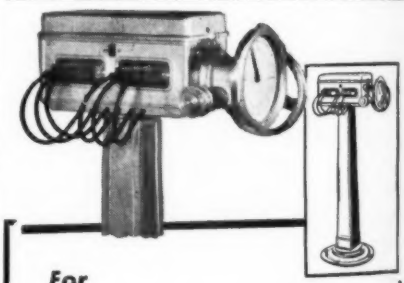
Linesetters are made in plain and valve types.

The Linesetter raises the meter only 2½" above the service line level, making it ideal for shallow outside settings and basement installations.

Catalog and complete information sent on request.

The FORD
METER BOX COMPANY, INC.
Wabash, Indiana

No. 16



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Write for Bulletin S-7.

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TO expedite meter repairs, first clean gear trains and other meter parts with OAKITE. This fast-acting emulsifier lifts off all muck and grease. Next, apply Oakite Compound No. 32 to remove lime scale quickly, thoroughly. Then, rinse. Parts come out clean, ready for repair . . . easy to reassemble.

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Water Softening and Demineralization

A new bulletin describing modern types of sodium and hydrogen zeolite water softeners and demineralizers has just been published by Liquid Conditioning Corp. **Bulletin 5** contains information on sodium zeolite water softeners utilizing the sodium cation exchange unit, hydrogen zeolite water softeners utilizing the hydrogen cation exchange unit-de-alkalizer, and the demineralizing two-step process.

It outlines the applications, principles of operation, and the equipment used in these methods of water treatment, and illustrates by flow diagrams and drawings the Liquon equipment manufactured by the company.

Copies of Bulletin 5 may be obtained by addressing the Liquid Conditioning Corp., 114 East Price St., Linden, N. J.

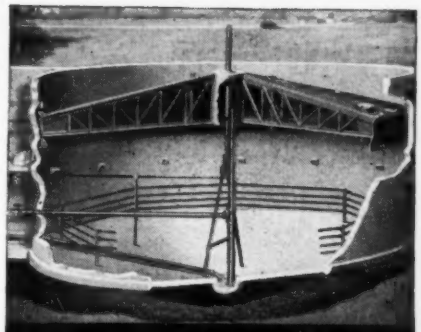
Activated Carbon Storage

"Activated Carbon Storage and Handling" is the title of an article by W. W. Aultman, Water Purification Engineer, of The Metropolitan Water District of Southern California, Los Angeles. This article appears in the May 1947 issue of the **Taste and Odor Control Journal.** The article is of particular interest because it explains how activated carbon is stored as a slurry or water suspension of one pound of carbon per gallon of water as a means of eliminating dusting problem. The carbon is fed to the water supply as a liquid suspension and this system of handling and feeding has worked very well.

Copies of the May issue of the *Taste and Odor Control Journal* may be obtained from the Industrial Chemical Sales Division of the West Virginia Pulp and Paper Co., 230 Park Ave., New York, N. Y.

Compound Water Meters

Not long ago, at a meeting of water works men, we heard the subject of metering industrial water supplies discussed, and the question was raised as to unauthorized uses of water. Perhaps one answer to the problem is the **Pittsburgh Empire Compound Water Meter,** as described in bulletin W-803 of the Pittsburgh Equitable Meter Division of Rockwell Manufacturing Co. This bulletin shows the principles of operation, and several exclusive



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provides a positive means of selecting and removing the best supernatant liquor from digestion tanks at a slow, continuous rate, regardless of location of supernatant in tank. Vertical slotted tube of selector extends through all zones where strata of supernatant form. Effective capacity of the tank for the reduction of solids is increased. Rate of withdrawal can be controlled within fairly close limits with the P.F.T. Supernatant Gauge, Sight-Glass and Sampler. Ask for Bulletin No. 243.

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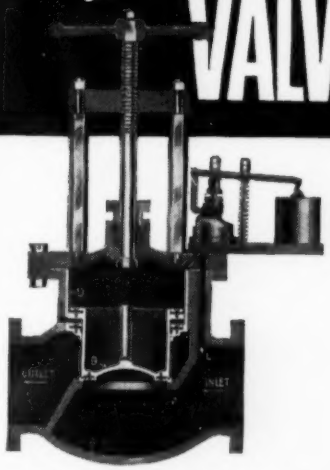

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Engineers and Sales Agents

features of this particular unit as well as dimensions, weights, capacities, etc.

Write Rockwell Manufacturing Company, Pittsburgh 8, Pa. for Bull. W-803.

Waste Recovery

In the May 1947 issue of **Link-Belt News,** published by Link-Belt Co., there is information on the recovery of valuable grease with Link-Belt Screen Collectors. This information concerns a packing plant, which recovers valuable grease solids and reduces stream pollution thereby. Persons who are confronted with industrial waste from coarse solids and sludge will be interested in this equipment and may obtain a copy of Link-Belt News for other information by writing Link-Belt Company, 307 N. Michigan Ave., Chicago 1, Ill.

More Water for Washington

One doesn't usually expect to find an article on water supply in a highway magazine, but in the April 1947 issue **The Highway Magazine** published by Armco Drainage & Metal Products, Inc., there is an article entitled, "More Water for the Nation's Capitol." This article tells about the new steel trunk water mains of Armco welded pipe, which are to bring water to Anacostia from the high reservoir in the eastern portion of the District of Columbia. One addition is 7,500 feet of 30-inch Armco Spiral Welded Steel Pipe, and the other is over 10,000 feet. These additions are required by the rapidly growing residential sections to the east of the Capitol.

The complete story may be found in the April issue of "The Highway Magazine" which may be obtained from the Armco Drainage & Metal Products, Inc., General Offices, Middletown, Ohio.

Synchronous Motor Control

The HOW and WHY and WHEN and WHAT of modern synchronous motor control is given in the E-M Synchronizer, Vol. 7, No. 3.

This 20-page book containing more than 45 diagrams and photographs entitled, **The ABC of Synchronous Motor Control** contains the story of "conscious" synchronous motor control, how the relay works, polarized field-frequency

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Our BETTER BLENDING means that each batch of BOND-O comes out of our machines exactly compounded and thoroughly mixed. Cast iron pipe joints made with BOND-O show this difference. Less initial leakage from every joint made.
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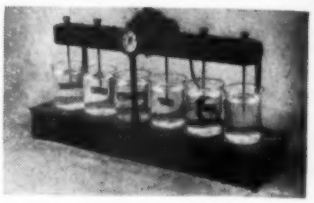
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IS the important piece of equipment in the Modern Water Works Laboratory. Now being used by leaders in water works research. Many superintendents and chemists have been able to reduce their chemical costs by the control of chemical dosages with this mixer. Write for literature.
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control, type of control for various operations, magnetic reduced voltage control, magnetic part-winding control, magnetic "Hi - Fuse" control, magnetic live-front synchronous, and group control.

This bulletin also contains suggestions for the operator as to how to keep the controls in good condition. The bulletin may be obtained by writing for Vol. 7 No. 3 of the E-M Synchronizer. Address your request to the Electric Machinery Mfg. Company, Minneapolis 13, Minn.

New Items

In the Spring 1947 issue of the Niagara **Pioneer,** a house organ of Niagara Alkali Co., there appear a number of new items of interest to water and sewage works men everywhere. Included in these are an "Automatic Water Sampler" which provides for continuous sampling. This device resembling a refrigerator permits sample collection at regular specified time intervals and should be of considerable help to water companies in their collection of samples.

Also included in this issue are a Motor Diaphragm Valve and a new improved Scoopmobile, a new hand sprayer, plastic hose nozzle, plastic air pump, gasoline driven revolving blade-type lawn mower and weed cutter, a small vice and an orange peel bucket for cleaning catch basins.

The *Pioneer* may be obtained from the Niagara Alkali Co., 60 East 42nd Street, New York, N. Y.

WRITE FOR THIS BULLETIN

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and WATER TESTS

A study of our 28-page Bulletin No. 602, containing the complete line of Hellige apparatus for pH control and water analysis, will enable you to form an intelligent opinion as to what is best suited for extending your present equipment or for an initial installation.

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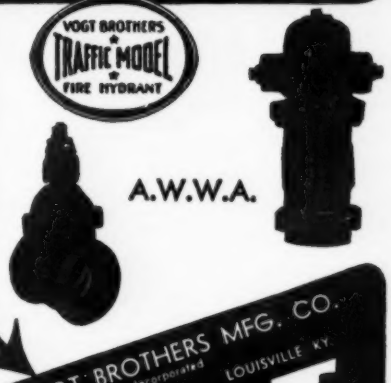

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One DeLaval Centrifugal Dual Motor Operated Pump; Capacity 28 MGD @ 400 RPM, 32' Head, 36 MGD @ 514 PPM, 50' Head. 200 HP and 400 HP, 6900 v., 60 cy. Electric Machinery Company Synchronous Motors.

Two DeLaval Centrifugal Pump Units; Capacity 22 MGD @ 600 RPM, 68' Head. Each equipped with 300 HP, 6900 v., 60 cy. Synchronous E-M Motors.

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One B&W Drum Sterling Boiler, 7000 sq. ft. operating capacity, 250 psi., 45,000 #/hr. continuous.

Taylor water cooled stoker, 6 retort underfeed, 125 sq. ft. grate surface, steam ash dump.

Furnace has water cooled front and bridge walls, Bernit Carborundum side walls. Diamont Soot Blowers, Bailey controls and gages.

This equipment in good condition, installed 1939, intermittently used only 3 years.

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Equipment in good condition consists of 72 paddles each 14' diameter x 8' wide. Shafts, Bearings, Elec. Motor Drive Units and Controls. Now installed in basins 120' and 100' wide, easily adaptable for reinstallation elsewhere.

All above equipment may be inspected at any time. More details gladly furnished upon request.

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POSITION WANTED

Practical engineer, age 39, 2 years college, 12 years' experience in construction, operation, and management of water supply and sewage disposal installations. Also experienced in incineration and land-fill methods of waste disposal.

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Civil-Sanitary Engineer, 21 years' experience municipal engineering. desires position as City Engineer, Sup't Water, Sewage.

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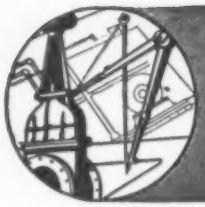

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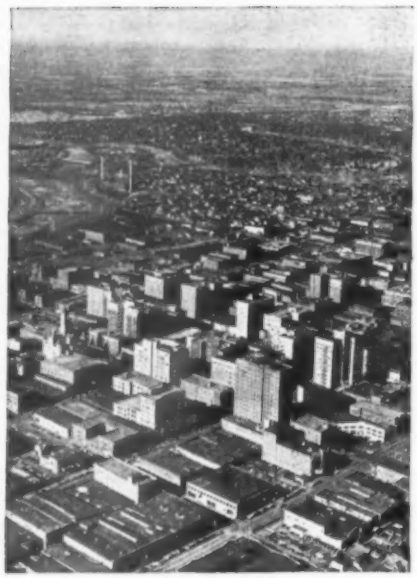

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Index TO ADVERTISERS

Albert Pipe Supply Co. 92
Albright & Friel, Inc. 98
Allis-Chalmers 4-5
Alvord, Burdick & Howson 98
*American Brass Co. 8
American Concrete Pipe Co. 18
*American Radiator & Standard Sanitary 90
*Anthracite Equipment Corp. 96
Argraves & Mort 98
*Atlas Mineral Products 79
Aurora Pump Co. 34
Automatic Control Co. 94

*Bailey Meter Co. 80
Badger Meter Mfg. Co. 23
Baker, Jr., Michael 98
Betz, W. H. & L. D. 98
Black & Veatch 98
Baw-Knox Co. 34
Bogert-Childs 98
Bowe, Albertson & Associates 98
Buck, Seifert & Jost 98
*Builders Iron Foundry 21
*Builders-Providence, Inc. 21
Burns & McDonnell 98
B/W Controller Corp. 34

*Calgon, Inc. 25
Camp, Dresser & McKee 98
Carborundum Co. 17
*Carter Co., Ralph B. 75
Cast Iron Pipe Research Assn. 12-13
Cement Gun Co. 87
Chapman Valve Co. ..... Second Cover
Chemical Equipment Co. 83
Chester Engineers, The 98
*Chicago Bridge & Iron Co. 9
*Chicago Pump Co. 73

Dean & Co., Payne 87
De Laval Steam Turbine Co. 10
De Leuw Cather & Co. 98
Diamond Alkali Co. 19
Dresser Mfg. Div. 82

Eddy Valve Co. 83
Edson Corp., The 96
Everson Mfg. Co. 94

Fairbanks-Morse 14
Fay, Spofford & Thorndike 98
*Flexible Sewer Rod Equipment Co. 78
*Flexible Underground Pipe Cleaning Co. 78
Ford Meter Box Co. 94

Gannett, Fleming, Cordy & Carpenter, Inc. 98
General Chemical Co. 22
General Electric Co. 6-7
Gilbert Associates, Inc. 98
Gillette Pub. Co. 30
Glace, I. M. 98
Glauber Brass Mfg. Co. 81
Goff, Wm. A. 98
*Golden-Anderson Valve Spec. Co. 95
Gorman-Rupp Co., The 16
Greeley & Hansen 98
Grinnell Co., Inc. 28

Havens & Emerson 98
Hayden, Harding & Buchanan 98
Haydock, Chas. 99
Hellige, Inc. 97
Holyoke Machine Co. 27
Hooker Chem. Co. 38
Hydraulic Development Corp. 94

*Infilco, Inc. 34
Iowa Valve Co. 92

*Jeffrey Mfg. Co. 31
*Johns-Manville 29
Johnston & Jennings Co. 90
Jones & Henry 99

Kennedy, Clyde Co. 99
Knowles, Inc., Morris 99

La Motte Chemical Products Co. 88, 93
Layne & Bowler, Inc. 100
Leadite Co., The 92
Lock Joint Pipe Co. ..... Third Cover
Lozier, Inc., Wm. Co. 99

M & H Valve & Fittings Co. 28
Mathews Hydrants 84
Mathieson Alkali Co. 11
Metcalf & Eddy 99
Meter Specialty Co. 96
Moore & Owen 99
Mueller Co. 15

Nat'l. Clay Pipe Mfrs. 32
*National Water Main Cleaning Co. 84
Neptune Meter Co. 40
Niagara Alkali Co. 35-36
*Northrop & Co., Inc. 96
Nussbaumer & Clarke, Inc. 99

Oakite Products, Inc. 95
*Omega Machine Co. (Division of Builders-Iron Fdry.) 85

*Pacific Flush Tank Co. 95
Parsons Brinckerhoff, Hogan & Macdonald 99
Payne Dean Co. 87
Peerless Pump Division (Food Machinery Corp.) 91
Philadelphia Quartz Co. 77
Phipps & Bird, Inc. 96
Pirnie Malcolm 99
Pitometer Co., The 99
*Pittsburgh Des Moines Steel Co. 33
Pittsburgh Equitable Co. 3
*Proportioneers, Inc. 89
Purcell, Lee T. 99

Regester, Robt. T. 99
Rensselaer Valve Co. 20
*Riddick, Thomas M. 99
Robert & Co. 99
Robert Filter Mfg. Co. 90
Rockwell Mfg. Co. 3
Roots-Connersville Blower Corp. 76
*Ross Valve Mfg. Co. 85
Russell & Axon 99

Sanequipment Engineering 97
Sargent, Lester L. 99
*Simplex Valve & Meter Co. 24
Sirrine & Co., J. E. 99
Skasol Corp. 95
Smith & Associates, Benj. L. 99
Stanley Engineering Co. 99
Stewart, W. H. 90
Streander, Philip B. 99
*Stuart-Brumley Corp. 96

Tate Pipe Linings 93
Taylor Co., W. A. 92
Thomson Meter Co. 40

U. S. Pipe & Fdry. Co. 37

*Vapor Recovery Systems Co. 26
Virginia Smelting Co. 74
Vogt Bros. Mfg. Co. 97
Vogt Manufacturing Co. 97

*Wallace & Tiernan Co., Inc. ..... Back Cover
Warren Foundry & Pipe Corp. 88
Weston & Sampson 99
Whitman & Howard 99
Whitman, Requardt & Associates 99
Wood Co., R. D. 86

Zeolite Chemical Co. 96

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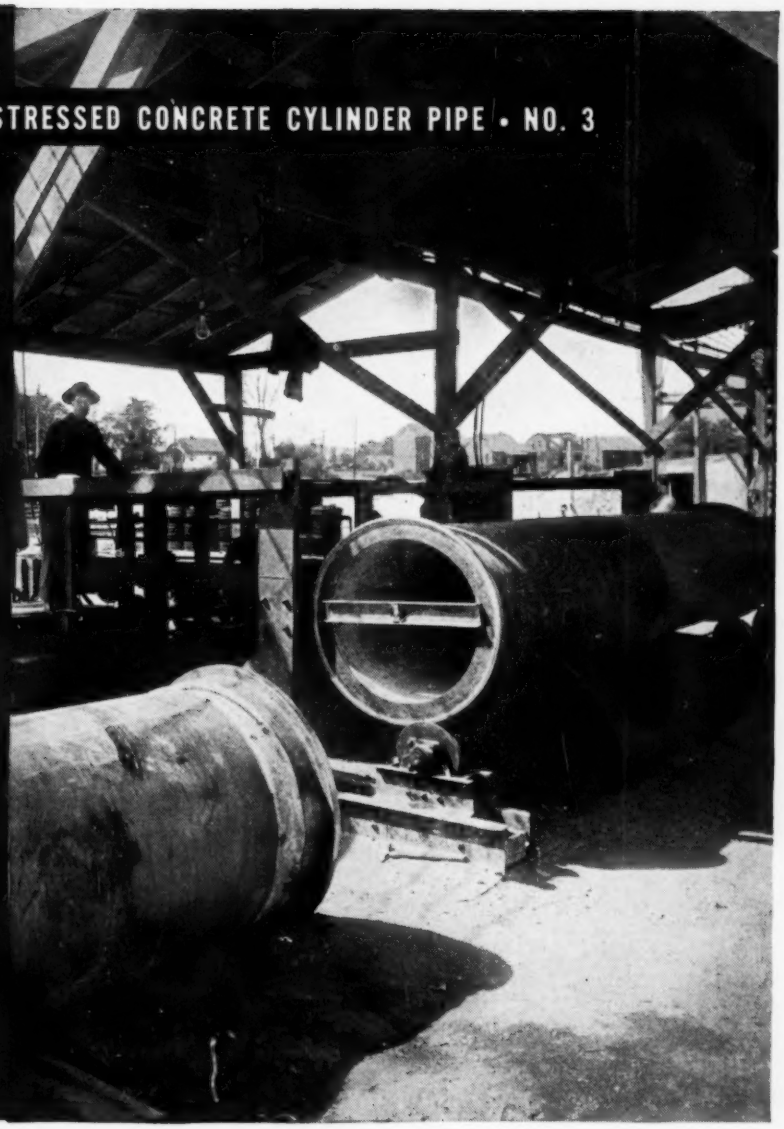

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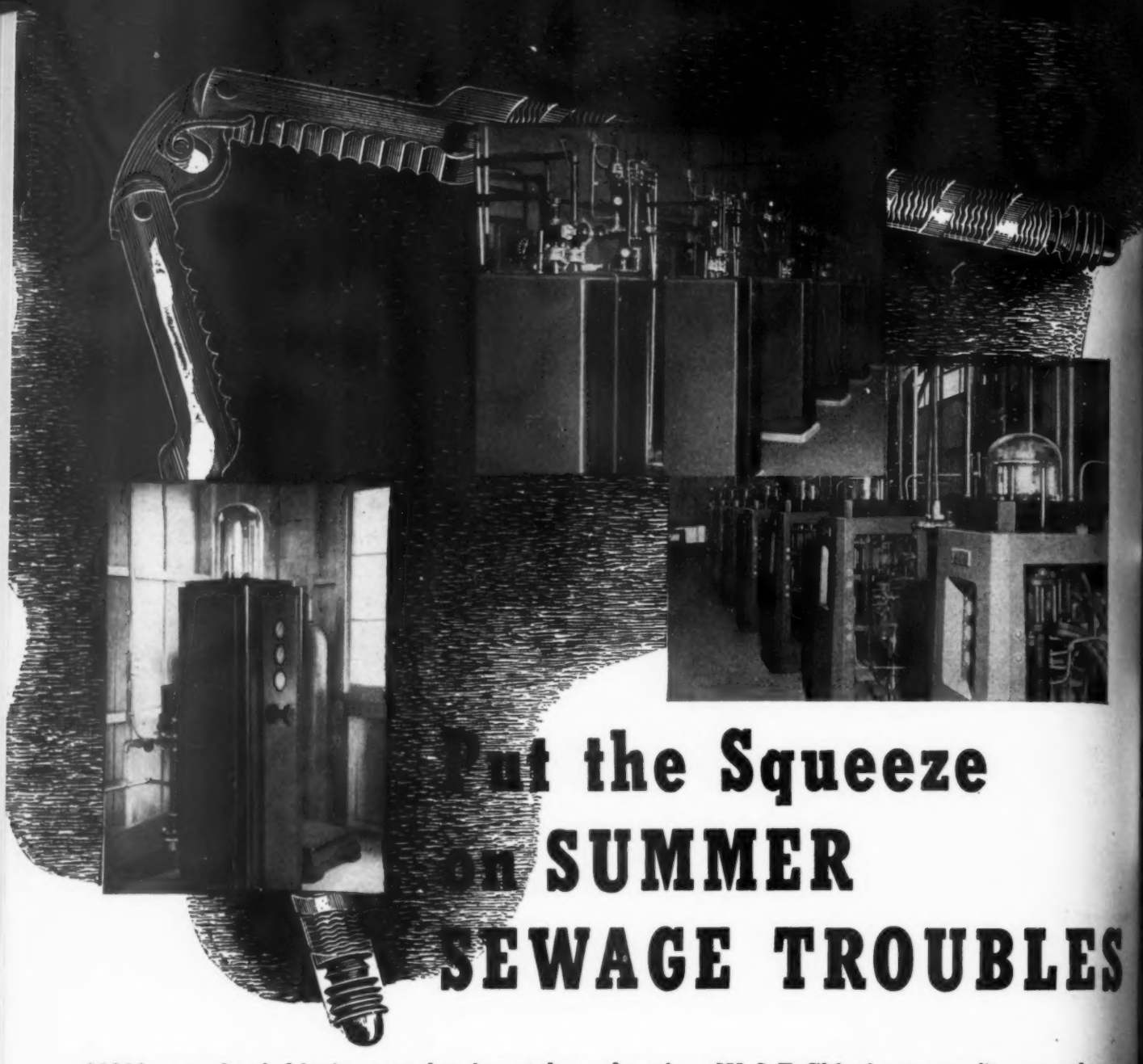

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